National Oceanic and Atmospheric Administration

Information Exchange for Marine Educators

Archive of Educational Programs, Activities, and Websites

A to G

Environmental and Ocean Literacy

Environmental literacy is key to preserving the nation's natural resources for current and future use and enjoyment. An environmentally literate public results in increased stewardship of the natural environment. Many organizations are working to increase the understanding of students, teachers, and the general public about the environment in general, and the oceans and coasts in particular. The following are just some of the large-scale and regional initiatives which seek to provide standards and guidance for our educational efforts and form partnerships to reach broader audiences. (In the interest of brevity, please forgive the abbreviations, the abbreviated lists of collaborators, and the lack of mention of funding institutions). The lists are far from inclusive. Please send additional entries for inclusion in future newsletters.

Background Documents

Developing a Framework for Assessing Environmental Literacy
NAAEE has released *Developing a Framework for Assessing Environmental Literacy*, developed by researchers, educators, and assessment specialists in social studies, science, environmental education, and others. A presentation about the framework and accompanying documents are available on this website.
http://www.naaee.net/framework

Executive Order for the Stewardship of Our Oceans, Coasts, and Great Lakes
President Barak Obama signed an Executive Order establishing the National Ocean Council. The Executive Order established for the first time a comprehensive, integrated national policy for the stewardship of the ocean, our coasts, and Great Lakes, which sets our nation on a path toward comprehensive planning for the preservation and sustainable uses of these bodies of water.
http://www.whitehouse.gov/administration/eop/oceans

Environmental Literacy in America - What 10 Years of NEETF/Roper Research and Related Studies Say About Environmental Literacy in the U.S.
http://www.neetf.org/pubs/index.htm

The U.S. Commission on Ocean Policy devoted a full chapter on promoting lifelong ocean education, *Ocean Stewardship: The Importance of Education and Public*

Awareness. It reviews the current status of ocean education and provides recommendations for strengthening national educational capacity.
http://www.oceancommission.gov/documents/full_color_rpt/08_chapter8.pdf

Environmental and Ocean Literacy and Standards
Mainstreaming Environmental Education – The North American Association for Environmental Education is involved with efforts to make high-quality environmental education part of all education in the United States and has initiated the National Project for Excellence in Environmental Education. Here are some of the products and initiatives:

- *National EE Certification Initiative* - NAAEE and EETAP are collaborating to explore development of a national certification program for environmental educators.
- *NCATE/NAAEE Program Standards for the Initial Preparation of Environmental Educators* – (in development) to be used by NCATE in their accreditation process of college/university teacher education programs across the country.
- *Higher Education Faculty and Program Directory Development* - electronic directory of EE programs and faculty in the college and university setting (with the National Council for the Accreditation of Teacher Education) - on-line in 2006.
- *Resource Review Program* for educational resources
- Guidelines, including *Environmental Education Materials, Nonformal Environmental Education Programs, Preparation and Professional Development of Environmental Educators,* and more.

http://naaee.org/

Science Content and Standards for Ocean Literacy is a product of workshops sponsored by National Geographic, NOAA, COSEE, NMEA, and the College for Exploration. It describes and presents essential principles and fundamental concepts for creating an ocean literate world and aligns them with the National Science Education Standards.
http://www.coexploration.org/oceanliteracy/index.html

Charting the Course for Ocean Science in the United States: The National Science and Technology Council Joint Subcommittee on Ocean Science and Technology is developing *Charting the Course for Ocean Science in the United States: Research Priorities for the Next Decade*, a draft document that outlines the national ocean research priorities for the United States for the next ten years. The document will describe a vision for U.S. ocean science and technology, highlight key areas of interaction of our society and the ocean, and identify critical ocean research priorities.
http://ocean.ceq.gov/about/sup_jsost_orpp_outreach.html

Ocean Literacy
This web site and online survey are the result of a partnership of agencies and institutions concerned with improving ocean literacy. Check out the extensive links under Education Resources, Links, and National & Regional Programs.
http://oceanliteracy.org/ .

Ocean Literacy Educational Materials Available
The National Geographic Office in Santa Barbara has had quantities of the following materials available:

- Ocean Atlas Teacher's Guides

- Oceans for Life Brochures

Contact Sally Ziegler at Sally.Ziegler@noaa.gov for inquiries.

Ocean Literacy Website
The College of Exploration has launched an Ocean Literacy website, with a complete set of scope and sequence charts which can be viewed as web pages or downloaded in a variety of different formats. Visitors can sign up for ocean literacy news, keep up with research, and more.
http://oceanliteracy.wp.coexploration.org/

Collaborations and Networks
American Zoo and Aquarium Association members are providers of animal care, conservation, and public education about wildlife, providing the highest standard of animal care while offering events and activities to help visitors understand how everyone can help keep our oceans and waterways safe.
www.azasweb.com

The Centers for Ocean Sciences Education Excellence is a network of seven regional centers that act locally and regionally, as well as think and act nationally. The goals of COSEE are to promote partnerships between research scientists and educators; to disseminate effective ocean sciences programs; and to promote ocean education to create a more scientifically literate workforce and citizenry.
http://www.cosee.net/

Coastal America's designated Coastal Ecosystem Learning Centers (CELCs) comprise a network of informal education institutions. Federal partners provide CELCs with information, expertise, and research vessel access for community education programs. The CELCs educate and involve the public in protecting our ocean ecosystems and coordinate community action projects.
http://www.coastalamerica.gov

The Environmental Education and Training Partnership is a consortium of leading national EE organizations, delivering environmental education training and support to education professionals for the purpose of increasing public knowledge about environmental issues, and enhancing the critical thinking skills necessary for individuals and their communities to make responsible environmental decisions.
http://eetap.org/

The Federal Task Force on Environmental Education, chaired by the EPA, facilitates communication and collaboration among federal agencies and departments that have common interests in supporting and implementing EE programs with emphasis on supporting joint interagency EE projects that leverage both federal and non-federal dollars.
http://www.epa.gov/enviroed/ftfee.html

The Global Learning and Observations to Benefit the Environment (GLOBE) is a worldwide network of students, teachers, and scientists working together to study and understand the global environment.
http://www.globe.gov/globe_flash.html

National Geographic Oceans for Life Internet Network - this website offers education resources, news, discussion and more on ocean literacy and bringing the ocean into the classroom.
http://www.ngsednet.org/oceans

National Marine Educators Association, affiliated with NSTA and the American Association for the Advancement of Science, brings together those dedicated to teaching and learning about the world of water, providing a focus for marine and aquatic studies world-wide. NMEA members are educators and scientists from K-12 classrooms, colleges and universities, museums, aquariums, research science centers, government agencies, and conservation organizations from 17 regional U.S. chapters and from 13 other countries. NMEA promotes awareness, appreciation, and conservation of our aquatic environment.
http://www.marine-ed.org/

National Oceanic and Atmospheric Administration's mission is to provide science, service, and stewardship to meet the nation's economic, social, and environmental needs. Creating an environmentally literate public is vital to NOAA meeting its mission and supports numerous educational materials and programs for students of all ages.
www.education.noaa.gov

The National Oceanographic Partnership Program is a collaboration of fifteen federal agencies to provide leadership and coordination of national oceanographic research and education initiatives. Since 1997, NOPP has invested $150M to support over 90 research and education projects involving roughly 200 public and private institutions, with comparable in-kind support from the research and education community.
http://www.nopp.org/

The Ocean Project works with its broad network of zoos, aquariums, museums and other conservation-oriented organizations to enhance ocean awareness among the public; change attitudes and behaviors for conservation; increase civic involvement in community conservation activities; and generate regional and national policy-focused action. Using values-based communications strategies and tools, their *Seas the Day* initiative promotes ocean awareness and encourages people to take action.
http://www.theoceanproject.org/

Ocean.US, the National Office for Integrated and Sustained Ocean Observations was created by NOPP to coordinate the development of an integrated ocean observing system, and includes education and outreach.
http://www.ocean.us

The United Nations Decade of Education for Sustainable Development - the overall goal is to integrate the principles, values, and practices of sustainable development into all aspects of education and learning to encourage changes in behavior that allow for a more sustainable and just society for all.
http://portal.unesco.org/education/en/ev.php-URL_ID=27234&URL_DO=DO_TOPIC&URL_SECTION=201.html

Web Portals

The Bridge, supported by Sea Grant and an official partner of COSEE and NMEA, is a clearinghouse for K-12 ocean science education websites. It includes professional

development, lesson plans, ocean science research data, links to aquariums and research institutions, and career information.
http://www.marine-ed.org/bridge

The Digital Library for Earth System Education is an online library of web-based resources at all educational levels for teaching and learning about the Earth as a system. It can be searched by keyword, grade level, resource type, collection, and by national standards, both NSES and National Geography standards.
http://www.dlese.org

EE-Link from NAAEE provides electronic access to environmental education programs, professional development, jobs, events, organizations and other resources.
http://eelink.net/

NASA's OceanLiteracy.Org website is dedicated to helping those interested in the development of a populace knowledgeable about our oceans, to find resources that will assist toward that goal.
http://www.oceanliteracy.org/

The National Science Digital Library is an online library for education and research in science, technology, engineering, and mathematics.
http://nsdl.org/

Regional Initiatives

From Sea to Shining Sea: Priorities for Ocean Policy Reform
A national ocean policy action plan for Congress, *From Sea to Shining Sea: Priorities for Ocean Policy Reform*, developed at the request of a bipartisan group of ten influential Senators, was delivered to Capitol Hill on June 13, 2006. The report calls for Congress to adopt a statement of national ocean policy that acknowledges in legislation the importance of the ocean to the nation's economic and ecological health and establishes a framework for all other ocean legislation.
http://www.jointoceancommission.org/press/press/release0613_assets/seareport.pdf

The Online Guide to Environmental Education in Georgia provides EE lesson plans based on state standards, a searchable database of Georgia's EE organizations and the resources they offer, a statewide calendar of EE events, monthly e-newsletter, and easy-to-access facts about Georgia's environment. A customized web system for seven additional southeastern states is in development.
http://www.EEinGeorgia.org

Minnesota's Environmental Literacy Scope and Sequence provides a systems approach to environmental education in Minnesota for pre-K through adult learners. The SEEK website provides a directory of environmental education resources.
http://www.seek.state.mn.us/eemn_c.cfm

Ocean Revolution is a bilingual, international youth-oriented program designed to connect and inspire a new wave of ocean advocates.
http://www.oceanrevolution.org

Public ocean literacy for southern California - The Aquarium of the Pacific, in partnership with CORE, has begun a project to identify and prototype the best strategies to engage

the public in learning about the ocean through a regional initiative based at the aquarium. Initial workshops have been held with scientists and educators, with the workshop findings to be used to engage the general public through education, exhibitry, and the media. Contact Adam Lau at alau@lbaop.org

Educational Programs

10 Best STEM Resources
The National Education Association offers a list of 10 Best STEM Resources - Science, Technology, Engineering & Mathematics Resources for preK-12. Be sure to browse the lesson plans linked to on this website, along with grants, teaching strategies, and much more.
http://www.nea.org/tools/lessons/stem-resources.html

100 Days — A Snapshot of NOAA's Response
NOAA has been on the scene from day one of the Deepwater Horizon/BP Oil Spill, providing coordinated scientific, weather, and biological information and products. This website offers a brief snapshot of some of NOAA's efforts through science, damage assessment, food safety, wildlife and habitat protection, and more.
http://www.noaa.gov/100days/100days.html

2014: The Year in Science
The journal *Nature* published a recap of the year 2014 in science. Check out Nature's 10 which profiles ten scientists who made key contributions in 2014; images of the year; the year's top stories; the most-read news stories; and more.
http://www.nature.com/news/2014-1.16547

3-D Geology of National Parks and Other Public Spaces
For 3D enthusiasts, this index provides a listing by subject of three-dimensional images of national parks and other locations. Users can search for images by selecting from a list of subjects, including rock types, landform and landscape types, plants and animals, and more. Visitors will need 3D viewing glasses.
http://3dparks.wr.usgs.gov/subject.htm

3D Topographic and Wave Simulations
ForgeFx is an interactive 3D simulation and visualization company. Their website showcases several useful interactive simulations, including a topographic map and 3D wave simulation. Students can see immediate changes online resulting from their variable input.
www.forgefx.com/casestudies/prenticehall/ph/topo/topo.htm

4-H Goes to Sea
4-H Goes to Sea is a pilot curriculum project for 4-H youngsters aged 6 - 13. University of New Hampshire marine docent volunteers partner with 4-H leaders to help with the curriculum. There are six modules: open ocean, Gulf of Maine and watersheds, sandy beaches, rocky shores, salt marshes, and estuaries. Field experiences introduce the module and the leaders are asked to use the curriculum in interim meetings.
Sharon.Meeker@unh.edu

4empowerment
4empowerment is dedicated to making a positive difference in the lives of individuals, communities, and our environment. They offer e-learning programs that provide the means for educators, communities, organizations, and companies to research, learn, collaborate, and take action on issues affecting their world. The *Cyberways and Waterways Program* offers a bi-lingual supplemental science program that integrates technology into the classroom through inquiry-based learning activities and lesson plans.
http://www.4empowerment.com/en/index.jhtml

4Teachers: Teach with Technology
This website from the Advanced Learning Technologies Project at the University of Kansas Center for Research on Learning offers a diverse set of resources to help teachers integrate technology into their classrooms. Check out the archived Teacher Testimony and Kids Speak, Online Educational Games, Professional Development for Ed and more.
http://www.4teachers.org/

5 Gyres
Together with their partners Pangaea Explorations and Algalita Marine Research Foundation, 5 Gyres organizes research expeditions, inviting scientists, journalists, and others to join the crew. The crews conduct research and communicate about the global impact of plastic pollution in the world's oceans and employ strategies to eliminate the accumulation of plastic pollution in the five subtropical gyres through multimedia outlets, peer-reviewed publications, lectures and school outreach, and other venues
http://5gyres.org/

5K Race for the Planet "Seahorse Sprint"
The Fort Fisher Green Team is out to prove that you can host a sustainable 5K race and fun family-oriented event, April 19, 2009 in Kure Beach, North Carolina. While competing in another area race, Green Team members were disappointed to see Styrofoam cups and trash cans filled with plastic bottles. Inspired to set an example for the racing community, the Green Team is co-sponsoring the aquarium's first "Seahorse Sprint". Contact Samantha Herbert for information to set up similar events, at Samantha.Herbert@ncmail.net.
http://www.ncaquariums.com/5k-race-for-the-planet-seahorse-sprint

5 Things More Deadly Than Sharks
There were plenty of great resources posted in conjunction with Discovery Channel's annual Shark Week. Check out this short video from One World One Ocean. Fear the vending machine! A quick search engine inquiry will bring you to additional items.
http://www.oneworldoneocean.com/video/entry/5_things_more_deadly_than_sharks

60-Second Science
Scientific American offers these minute-long introductions to a wide range of science-related topics and investigations. New podcasts are added every weekday. Visitors can sign up to learn about new additions via RSS feed or iTunes.
http://www.scientificamerican.com/podcast/podcasts.cfm?type=60-second-science

7 Generations
The 7 Generations manual, *Addressing Village Environmental Issues for the Future Generations of Alaska*, is designed for people in rural Alaska who want to accomplish

environmental planning and management using a community based approach. This downloadable manual was written to assist communities to be more self reliant, and to take responsibility for their own environmental issues. It includes planning process, surveys, funding sources, and more.
http://www.7generations.us/page2.html

72&Rising Magazine
This magazine covers topics from wildlife and conservation to photography and adventure with a conservational/research approach to oceans and waterways. The magazine can be read online, though it may take a few minutes to get used to the technology needed to read it.
http://issuu.com/72andrising/docs/72andrising_vol1_290710_2

10 Tips to Make the Most of Conferences
Southern Fried Science offers 10 Tips for graduate students to make the most of scientific conferences. These tips can be useful for everyone, not just grad students.
http://www.southernfriedscience.com/?p=15246

10,000 Islands Dolphin Project
The project mission is to not only research the bottlenose dolphin population in Southwest Florida, but also educate students from any location in the world on the environment and its importance by using modern technology to bring nature into the classroom. The education program is composed of up to 20 lesson plans targeting third to seventh graders, all aligned to Common Core State Standards.
http://www.dolphinprojecteducation.org/

A-Z of Areas of Biodiversity Importance
UNEP-WCMC announces the launch of the website The A-Z of Areas of Biodiversity Importance, an online resource to provide information on important areas for biodiversity conservation ranging from World Heritage Sites to Key Biodiversity Area, including Ramsar sites. Areas include biodiversity hotspots, important bird areas, intact forest landscapes, and much more.
http://www.biodiversitya-z.org/

AAAS Atlas of Population and the Environment
The AAAS Atlas of Population and Environment provides maps, text, and graphics that quantify and illustrate the broader links between population dynamics and the environment. Analyses of individual topics bring together what is known about the ways in which people impact the Earth's environment. Lastly, the atlas contains six case studies that look at population-environment relationships in selected areas.
http://atlas.aaas.org/ .

AAAS Launches Public Outreach Initiative Focused on Science Literacy
Science. It's Everywhere is a public outreach initiative by the American Association for the Advancement of Science through the Partnership for Science Literacy. Designed to help parents and families play a more active role in their children's science education, it includes multi-media advertising along with a web site, in English and Spanish, to help motivate parents and families to take action in helping their children learn science.
http://www.tryscience.org/parents/parent.html

Aboriginal Canada Portal
Learning about native peoples in Canada has never been so easy as with this website created by the government of Canada, in partnership with the Assembly of First Nations and other stakeholders. Visitors can search the entire site's contents through a search engine on the homepage, or select thematic areas as education, environment and natural resources, and more. Check out the links to kid-friendly games, traditional ecological knowledge, conservation and protection, and much more.
http://www.aboriginalcanada.gc.ca/acp/site.nsf/en/index.html

Above and Below the Waves: Coastal and Oceanic Treasures Conserved in the National Park System
The National Park Service established the Ocean Park Stewardship Plan, with goals and priorities to restore and maintain the tremendous biological and recreational values of ocean and coastal resources across the National Park System, in collaboration with state and federal agencies and park stakeholders. Examples of successful joint stewardship programs can serve as models for managing marine resources that attract academic interest.
http://www.nps.gov/pub_aff/oceans/conserve.htm

ABCs of Ecology
The ABCs of Ecology®: An Educator's Guide to Learning Outside is useful for those looking for outdoor activities and lesson plans to help children understand the world in which they live, and includes chapters and background information on geology, climate, forest, ABCs of ecology, and watersheds. The lessons are geared for 3rd - 8th grade levels
http://www.fbes.org/store/ABCsoEcologyFlyer.pdf

About Coral Reefs
NOAA's Coral Reef Information System (CoRIS) is designed to be a single point of access to NOAA coral reef information and data products, especially those derived from NOAA's Coral Reef Conservation Program. The website includes introductory material about coral reefs, deep water corals, coral diseases, and more.
http://coris.noaa.gov/about/

Abrupt Impacts of Climate Change: Anticipating Surprises
This downloadable brief by the National Academies of Sciences looks at what we know about abrupt changes in the climate system, identifies needed research, and recommends creating an abrupt-change, early-warning system to make sure we aren't caught off guard.
http://dels.nas.edu/Materials/Report-In-Brief/4265-Abrupt-Impacts?bname=

Acid Test
Acid Test: the Global Challenge of Ocean Acidification, a film produced by the National Resources Defense Council, was made to raise awareness about the problem of ocean acidification, which poses a fundamental challenge to life in the seas and the health of the entire planet. The video and additional outtakes can be viewed online or downloaded from the website, or ordered on DVD.
http://www.nrdc.org/oceans/acidification/aboutthefilm.asp

Acronym Finder
Find out what an acronym, abbreviation, or initialism stands for on this easy-to-use webpage.
http://www.acronymfinder.com/

Across the Spectrum: Resources for Environmental Educators
This downloadable collection of resources, perspectives, and examples will help nonformal environmental educators learn more about the field of EE, access resources, and gain skills to improve their practice and, over time, build a community of practitioners to advance the field. The document covers the foundations of EE, strategies, trends, and tools.
http://www.naaee.net/sites/default/files/publications/eebook/EEebook_download.pdf

Act Green
Scholastic has launched ACT GREEN!, an educational website designed to motivate and empower kids to take action in school, at home, and in their community to preserve the environment. The multi-media website provides kids, parents, and teachers with customized green plans, expert tips, short films provided by Live Earth, and a "Greenroom" to share ideas with other kids.
http://www.scholastic.com/actgreen/

Activities for the Changing Earth System
Ohio State University offers an online version of their Earth Systems Education Program publication, Activities for the Changing Earth System, with information and activities including ice core importance, contributions of volcanoes to climate change, and more. There are ten middle school and ten high school activities.
http://earthsys.ag.ohio-state.edu/project/pubs/ACES.html

Activities and Resources for Earth Science Teachers
The Maine Geological Survey website offers downloadable lessons from the Curriculum Resources for Earth Science Teachers Activity Book, covering a wide range of geologic subjects. Topics include hydrogeology, environmental geology, map reading, and more. Check these out.
http://www.maine.gov/doc/nrimc/mgs/education/lessons/index.htm

Adaptation 2009
Adaptation 2009: Safeguarding Fish, Wildlife and Natural Systems in the Face of Climate Change, was convened by the Wildlife Habitat Policy Research Program and the National Wildlife Federation in February 2009. The conference breakouts were organized around four natural systems: forests, grasslands and shrublands, freshwater ecosystems, and coasts and estuaries. Presentations are available for viewing or via audio from the website, along with summaries and other materials.
http://ncseonline.org/WHPRP/NWF/Adaptation2009/

Adaptations from the Depths
The Flower Garden Banks National Marine Sanctuary offers its *Adaptations from the Depths* curriculum, downloadable from the web. This curriculum introduces elementary students to animal adaptations as they relate to the octopus. The full curriculum text, including reproducibles, or a separate document with just the handout masters are available. Additional materials can be mailed to you upon request, at no charge. Send

an email with your mailing address to flowergarden@noaa.gov to request the supplemental materials. Check out the website for other resources.
http://flowergarden.noaa.gov/document_library/ed_documents.html

Adapting to Climate Change
Adapting to Climate Change: A Planning Guide for State Coastal Managers includes science-based information on climate change and other hazards, and outlines steps for setting up a planning process, assessing vulnerability, devising a strategy, and implementing the plan. The goal of the guide is to help coastal states and communities get organized to take action in the face of a changing climate, have the tools to take action, and take action to plan for and adapt to the impacts of climate change.
http://oceanservice.noaa.gov/news/weeklynews/sept10/adapt_guide.html

Adopt a Beach Activities
The Alliance for the Great Lakes encourages service learning through the Great Lakes Adopt-a-Beach™ program. The curriculum helps students learn about the environment and help their community while they check water quality, investigate beach health, remove litter and debris, and more. The website offers downloadable lesson plans and activities.
http://www.greatlakes.org/teachadoptabeach

Adopt-A-Beach School Assembly Program for Los Angeles Watershed
The Malibu Foundation offers a comprehensive environmental program designed to motivate teachers and K-12 students to care about beaches and oceans. The *Adopt-A-Beach School Assembly Program* demonstrates how beaches and oceans get dirty and provides hands-on opportunities to make a difference by recycling, reducing litter, and cleaning up the beaches.
http://www.malibufoundation.org/tmffe004.htm

Adopt a Drifter Program
NOAA's Office of Climate Observation established the Adopt a Drifter Program in December 2004. The program provides teachers with an educational opportunity to infuse ocean observing system data into their curriculum. The website includes lesson plans, background information, and more.
http://www.adp.noaa.gov/index.html

Adopt a Microbe
Students, teachers, groups, everyone can Adopt a Microbe from the deep biosphere, an outreach project of the Juan de Fuca Hydrogeology expedition (see above). Get to know your microbe through weekly activities and submit your projects online for prizes. The website will be completed soon, but has enough information on it already to get you started.
http://sites.google.com/site/adoptamicrobe/

AdoptaClassroom.org
Adopt-A-Classroom partners donors with teachers so you can have funds to purchase critical resources and materials for your classroom. The process is relatively simple -- teachers ask for assistance, and donors can choose to support those needs through the website.
https://www.adoptaclassroom.org/

Advanced Field Oceanography
The University of Washington, School of Oceanography's course, Oceanography 444, is a five-credit undergraduate course. This year, their research has been aboard the *R/V Thomas G. Thompson* near the Galapagos Islands. In addition to planning, performing, and writing up their own research, the students were responsible for much of the cruise planning. This is a good site for your students to get a feel for oceanography and research from the students' perspective.
http://courses.washington.edu/ocean444/

Advanced Placement Environmental Science Course – Online
Based on curriculum developed for California schools, the Advanced Placement Environmental Science course developed by the University of California College Prep initiative is now available through the Encyclopedia of Earth website. The online course includes 25 chapters on topics ranging from energy flows to environmental laws and regulations; the chapters may be used independently as a resource for teachers and students or sequentially as a full course.
http://www.eoearth.org/article/AP_Environmental_Science_Online_Course

Advanced Technology Environmental and Energy Center
The Advanced Technology Environmental and Energy Center promotes and supports environmental and energy technology education to address the needs of the national and global workforce. They offer a variety of downloadable resources for teaching about energy and the environment. Materials include Developing Water Quality Index, Invasive Species, and more. Free registration is required.
http://www.ateec.org/store/index.php

Adventure Marine
Adventure Marine offers a marine science program at sea aboard the research vessel *Pacific Monarch*, traveling from Long Beach Harbor to the Island of Catalina in California. The ship is equipped with wet lab touch tanks, snorkeling gear, underwater camera, color sonar, and more.
http://www.adventuremarine.org/

Adventures of Ed the Bear
Stephen Savage is currently developing a marine based education project that will introduce U.K. schools to marine habitats around the world, along with global marine conservation issues, through a weblog seen through the eyes of the teddy bear, Ed the Bear. Ed hopes to show how his local coastline fits into the bigger picture and also to create a point of references for local U.K. schools to compare with Ed's global adventures.
http://adventuresofedthebear.blogspot.com/

Adventures of Fred the Monkey
Ron Hirschi and Fred the Monkey want to connect with kids about oceans, marine debris, and especially ridding the sea of plastics. Follow Fred on his journeys, including a recent trip to Pihe Manu (Midway Atoll), his research into micro-plastics in beach sand, and his future adventures, including SOARing with Fred. Keep in touch by way of Postcards from Fred on his website.
http://soaronhirschi.blogspot.com/

Aegean and Black Sea 2006 Expedition
NOAA's Ocean Explorer offers information and educational materials for the 2006 Aegean and Black Sea expedition, the first mission of a multi-year geological and archaeological study in the Sea of Crete. An interdisciplinary research team of archaeologists and oceanographers will pursue major mission goals of finding well-preserved marine archaeological sites, studying ancient maritime trade, and exploring the history of the Thera volcano. The Ocean Explorer Expedition Education Module includes a summary of the purpose of this expedition; lesson plans designed specifically for this expedition; interactive multimedia presentations and Learning Activities on Plate Tectonics, Mid-Ocean Ridges, and Subduction Zones; profiles of scientists representing careers featured during this mission; and a list of other resources and links related to the 2006 Aegean and Black Sea mission. Immersion Presents featured numerous live broadcasts during the expedition; log onto their website and click on "Channel" to view the following:

- Ancient Eruptions; June 3-June 8, 2006; 30-minute shows from the Aegean Sea
- Updates from the Sea of Crete; June 10-June 15, 2006; featuring expedition scientists

www.uri.edu/endeavor
www.uri.edu/endeavor/thera/index
http://www.oceanexplorer.noaa.gov/explorations/06blacksea/welcome.html
http://www.immersionpresents.org

***After the Storm* Television Special about Watersheds**
The Environmental Protection Agency and the Weather Channel co-produced *After the Storm*, a television special about watersheds. *After the Storm* shows the connection between weather and watersheds and the importance of watershed protection. Key scientists, water quality experts, and citizens involved in local and national watershed protection efforts provide insight into the problems as well as solutions to today's water quality crisis. DVD copies of the half-hour television special about watersheds, After the Storm, are now available at no charge. In addition to free DVD copies, the video is available for downloading, complete with on-video text transcript.
http://www.epa.gov/weatherchannel/

African Dust, Coral Reefs, and Human Health
The USGS offers this website with an overview video of Coral Mortality and African Dust. The documentary identifies how recent changes in the composition and quantities of African dust transported to the Caribbean and the Americas might provide clues to why Caribbean coral reef ecosystems are deteriorating, and how human health may be impacted. The documentary also offers the transcribed narrative.
http://coastal.er.usgs.gov/african_dust/
http://gallery.usgs.gov/videos/223

El Agua Es Importante
El Agua Es Importante: guia de maestro sobre recursos de agua, Volumen 3, available free, includes a teacher's guide and posters created by the U.S. Geological Survey's Water Resources Education Initiative. Designed to help primary and middle school teachers satisfy National Science Education Standards and promote query-based, hands-on learning, topics include oceans and coastal hazards, watersheds, and more.
http://www.epa.gov/ncepihom/ordering.htm

Agua Pura Curriculum
The *Agua Pura: Exploring Salmon and Steelhead in California Communities* curriculum teaches children about salmon and steelhead biology, and the critical relationship these fish have to healthy watersheds. Using real-life investigation and problem solving skills, participants investigate the natural history of their local salmon or steelhead populations, find out how human activities have impacted these populations in local rivers and streams, and work with other community members to enhance salmon and steelhead habitat within the community. The worksheets and the parents' letter are available as English or as side-by-side English/Spanish versions.
http://www.sns.ucdavis.edu/

Agulhas Current Time-Series Experiment
Join scientists from University of Miami's Rosenstiel School of Marine & Atmospheric Science on this research expedition from Port Elizabeth, South Africa for a month-long study of the Agulhas Current aboard *R/V Melvill*e. The website will offer information about the expedition, journal entries, an opportunity for participation, and more.
http://act.rsmas.miami.edu/

Aiming for Excellence: An Evaluation Handbook for Interpretive Services in California State Parks
This handbook provides measures and measurement tools for assessing the quality of educational and interpretive services. It includes visitor evaluation, performance appraisals, evaluation forms and a bibliography. It is available for downloading from the website.
http://www.parks.ca.gov/default.asp?page_id=21700

Air – Here, There, Everywhere!
The Chemists in the Library Working Group of the American Chemical Society has compiled electronic and print resources about climate for further exploration of Chemists Celebrate Earth Day: Air - here, there, everywhere! The resources have been classified by grade level and annotated. The website includes basic characteristics of the Atmosphere, Understanding Weather, Climate, and many resources for further information.
http://library.stanford.edu/depts/swain/hosted/earthday/2005/index.html

Air Quality Workshop for Teachers: A Toolkit for Facilitators
The goal of the downloadable Air Quality Workshop for Teachers: A Toolkit for Facilitators is for K-12 teachers to gain a better understanding of air quality and air pollution issues, and gain insight into topics such as global warming and climate change, calculating a carbon footprint, and the health effects of air pollution. The materials are taken from the workshop provided each year by EPA's Office of Air Quality Planning and Standards.
http://airnow.gov/index.cfm?action=learning.workshop_for_teachers

Air: The Search for One Clean Breath
The film, Air: The Search for One Clean Breath acts as a biography of air. With animation and live action, viewers take a guided tour of the story of air, from its ancient beginnings to today's clean air technologies. In addition, the downloadable Educator's Guide for middle and high school instructors and accompanying classroom lessons enable students to not only see the film, but understand more about air quality by expanding upon the material presented in the film.

http://www.vcapcd.org/AirTheFilm/teacher.htm

Air and Waste Management Association Lesson Plans
The Air and Waste Management Association offers Environmental Education Resource Guides on CD, with background information, fact sheets, glossaries, and 50 lesson plans for grades K-5 on several air and water pollution topics. The website offers four of the lesson plans free for downloading, about nonpoint source pollution and air quality.
http://www.awma.org/education/freelessons.asp

Airbnb Diaster Response
Airbnb offers their lodging booking services for free for disaster victims. Those looking to share their space can list it on the site, and disaster victims will be matched with possible hosts.
https://www.airbnb.com/disaster-response

Alabama Learning Exchange
The Alabama Learning Exchange is a project of the Alabama Department of Education, designed to index and share many types of educational materials and information through a one-stop resource for educators, parents, and students. The resources include lesson plans, web links, and interactive activities. Be sure to check out the distance education and professional learning sections.
http://alex.state.al.us/index.php

Alaska Coastal Calendar
Explore Alaska's climate—past, present, and future—with Alaska Sea Grant's 2008 Alaska Coastal Calendar. The calendar celebrates the International Polar Year, and features photos and detailed narratives describing the changing climate and scientific research being done to better understand the effects of change on Alaska's coast, people, and wildlife. Each month is devoted to a different theme around which lessons can be centered.
http://seagrant.uaf.edu/bookstore/pubs/SG-ED-58.html

Alaska CoastWatch Manual
The Center for Alaskan Coastal Studies offers a downloadable Alaska CoastWatch manual and other online resources for identification of Alaskan seaweeds and fishes, in the teacher and community resource sections on their website.
http://www.akcoastalstudies.org/teacherresources.htm

Alaska Department of Fish and Game Website
The Alaska Department of Fish and Game's mission is to manage, protect, maintain, and improve the fish, game and aquatic plant resources of Alaska. The website contains many resources of interest to marine and coastal educators, including the Alaska Wildlife Curriculum, the Wildlife Notebook Series, and links to refuges, critical habitats, and sanctuaries.
http://www.sf.adfg.state.ak.us/region2/ie/Teacher_Resources/html/teachres.stm

Alaska Fisheries Science Center Cold Water Coral Video and Science Resource Guide On-Line
Journey deep beneath the cold waters of the Aleutian Island archipelago from your computer and explore the rich abundance of life on the sea floor. The "Coral Gardens of the Aleutians" streaming video is set up for either Broadband or dial-up connection. Also

available from Alaska Fisheries is a down-loadable Science Resource Guide to help students understand the work of NOAA Fisheries.
http://www.afsc.noaa.gov/abl/MarFish/coral_gardens_video.htm
http://www.afsc.noaa.gov/sep/ResGuide_TOC.htm

Alaska Fisheries Science Center Resources
The Alaska Fisheries Science Center website offers numerous resources, including a Marine Science Resource Activity Guide, online Rockfish games, the Marine Mammal Education Web and much more. The Multimedia Gallery offers award-winning videos, photos, and much more. Additional sections include data and tools, publications, and species information. Spend some time on this website.
http://www.afsc.noaa.gov/default.htm

Alaska Islands & Ocean Visitor Center
The Alaska Islands & Ocean Visitor Center, in Homer, Alaska, recently opened. This interpretive, educational, & research facility is a partnership of the Alaska Maritime National Wildlife Refuge and the Kachemak Bay Research Reserve, dedicated to the understanding and conservation of the marine environment. The facility offers visitors a window into the world of seabirds and other marine animals, as well as their islands and ocean habitats.
http://www.islandsandocean.org/index.html .

Alaska Native Perspectives on Earth and Climate
Teachers' Domain has launched a new collection of media resources that looks at earth sciences from the perspective of the people of Alaska. In this collection, students learn both Native ways of knowing nature, and ongoing scientific research about Alaska's unique geology, and how climate change and development are affecting the region.
http://www.teachersdomain.org/special/ean/

Alaska Regional Resource Directory
COSEE Alaska is creating a directory to link scientists seeking outreach and education opportunities with the educators and science outreach and media specialists who are their potential partners. The resource directory will be developed as an online, searchable database and published as a hard-copy once a year for distribution at the Alaska Marine Science Symposium.
http://www.coseealaska.net/news/index.cfm?FuseAction=ShowNews&NewsID=193

Alaska Seabirds Curriculum
The Alaska Islands and Ocean Visitor Center, an educational and research facility, is a partnership of the Alaska Maritime National Wildlife Refuge (the world's largest seabird refuge) and Kachemak Bay Research Reserve (a dynamic estuary). The website features a virtual tour, Alaska Seabirds Curriculum, and more.
http://www.islandsandocean.org/education/index.html

Alaska Seas and Rivers Curriculum
Visit Alaska Sea Grant's website to download the new online Alaska Seas and Rivers marine/aquatic curriculum. Developed by Alaskan teachers, the curriculum offers units for use by teachers and homeschoolers, interpreters, youth groups, and others.
http://seagrant.uaf.edu/marine-ed/curriculum/

Alaska Small Press Catalogue
Wizard Works publishes a variety of titles through the Alaska Small Press Catalogue for the US Fish and Wildlife Service, including *Arctic Nesting Shorebird Guide*, *Wetlands and Wildlife,* and *Teach About Geese*. In addition, they publish the Alaska Wildlife Curricula for the Alaska Department of Fish & Game. This includes *Alaska's Ecology*, *Alaska's Forests & Wildlife*, *Alaska's Tundra & Wildlife*, *Wildlife for the Future*, and the *Alaska Ecology Cards*.
http://www.xyz.net/~wizard/home.htm .

Algae: The Forgotten Treasure of Tidepools
Hosted by the Department of Biology at Sonoma State University, this very informal website introduces browsers to the world of algae through a small collection of different alga images. The website's three galleries feature seaweeds of the Green (Chlorophyta), Red (Rhodophyta), and Brown (Phaeophyta) varieties, accompanied by brief and easily read text. The home page links to more extensive resources for those who have become intrigued by algae and want more information.
http://www.sonoma.edu/biology/algae/algae.html

Algalita Marine Research Foundation Materials
The Algalita Marine Research Foundation is dedicated to the protection of the marine environment and its watersheds through research, education, and restoration. They offer K-12 education programs which include cirriculums and/or DVDs set to California's science standards. In addition, they have downloadable materials on plastic debris, a watershed companion curriculum, research articles, and more. Some materials are available in Spanish.
http://www.algalita.org/education.html

Alliance for Climate Education
ACE – the Alliance for Climate Education – is dedicated to educating America's high school students about the science behind climate change and inspiring them to do something about it. The website includes information about the ACE Assembly: Presenting climate science that sticks; Student Action Program: Kickstarting climate projects; and more. The website has been moved to this new location; check out the lesson plan links.
http://www.acespace.org/

All About Bird Biology
The education program at the Cornell Lab of Ornithology offers this new website, All About Bird Biology. Developed as a companion site to the All About Birds species guide, the website takes visitors deeper into the lives of birds and highlights what they teach us about biology. The website features videos, articles, slides, and more. The new website starts with Feathers and developers have Bird Song and Fancy Males in the works.
http://biology.allaboutbirds.org/

All About Birdhouses
The folks at Cornell Lab of Ornithology continue to devise useful tools for citizen scientists. All About Birdhouses offers information about birdhouses or nest boxes for more than 50 species. And check out the new blog, Citizen Science.
http://nestwatch.org/learn/all-about-birdhouses/
http://www.birds.cornell.edu/citsci/

All About Birds
Brought to you by the Cornell Lab of Ornithology, this site includes an on-line guide to birdwatching, sound files of bird songs, a video gallery, and links to a variety of sites where you can report your observations. The conservation section highlights bird conservation success stories. Other information includes habitat management, an educator's guide to bird study, and how to get involved.
http://www.birds.cornell.edu/programs/allaboutbirds/ .

All About Wetlands Newsletter
"All About Wetlands" is a new newsletter published quarterly by Environmental Concern Inc, publishers of the peer-reviewed publication, *Wetland Journal*, from 1993 to 2001. "All About Wetlands" contains articles covering a wide array of wetland topics and issues from around the world. Join Environmental Concern, Inc. to receive a copy of the newsletter.
www.wetland.org .

All of Earth's Water in a Single Sphere
This illustration shows the size of a sphere that would contain all of Earth's water in comparison to the size of the Earth.
http://ga.water.usgs.gov/edu/2010/gallery/global-water-volume.html

All in One Place
Educators looking for the latest ocean science news and resources can find them all on the Bridge's front page. From information on on-going ocean research expeditions to our teacher-reviewers' top picks, the homepage is a one-stop shop. There are links to Scuttlebutt, the email discussion list, along with the Bridge-authored Data Analysis Teaching Activities (DATA) series. If you need resources on a particular topic, you will find the Bridge powerful search engine.
http://www.marine-ed.org/bridge

All the Way to the Ocean
All the Way to the Ocean is a children's book about two friends' discovery of the harmful effects of ocean pollution. This story deals specifically with storm drain run-off that travels directly into our natural bodies of water. The book's colorful illustrations and simple text should help educate readers and inspire them to fight pollution.
http://www.allthewaytotheocean.com/

Altered Oceans
Altered Oceans is a five-part series on the crisis in the seas published on-line by the Los Angeles Times on latimes.com. Part one, *A Primeval Tide of Toxins*, discusses cyanobacteria. The second part, *Sentinels Under Attack*, is about toxins affects on marine mammals. The remaining parts discuss marine debris, changing ocean chemistry, and algae blooms. Links are also provided for more in-depth information.
http://www.latimes.com/news/local/oceans/la-oceans-series,0,7842752.special

Alternatives for Coastal Development: One Site, Three Scenarios
This website, *Alternatives for Coastal Development: One Site, Three Scenarios,* illustrates three different development scenarios created for a residential area in coastal Georgia. The website includes maps and details of three different designs; comparisons

of environmental, economic, and social indicators; three-dimensional views of each; detailed project methodology; and growth and development-related information.
http://www.csc.noaa.gov/alternatives/ .

Alvin's Animals
Alvin's Animals from Woods Hole Oceanographic Institution offers up images of various benthic-dwelling creatures that Alvin explorers have found during their deep-sea submersions. Visitors can view items by heading such as Benthic Life, Sharks & Other Fish, and more.
http://www.whoi.edu/oceanus/feature/alvins-animals

America, the Ocean, and Climate Change
New public opinion research, *America, the Ocean, and Climate Change: New Research Insights for Conservation, Awareness, and Action*, commissioned by The Ocean Project in collaboration with Monterey Bay Aquarium and National Aquarium, surveyed over 22,000 Americans on a comprehensive range of ocean- and environment-related topics. The website offers downloadable files, key findings, and more.
http://www.theoceanproject.org/resources/America_the_Ocean_and_Climate_Change.php

America Recycles Day
America Recycles Day is November 15, 2005. The America Recycles Day website offers background information through *Recycling 101*, a contest (entry deadline is America Recycles Day), and an easy-to-use search function for recycling activities in your state. For example, a Trash to Treasure Kid's Fair in Culver City, California on November 19, 2005 includes a recycled art competition (see http://www.ecostation.org/).
http://www.americarecyclesday.org/home.html

America's Underwater Treasures
Jean-Michel Cousteau: Ocean Adventures returns this September with the series finale, a two-part special investigation about the 13 National Marine Sanctuaries. America's Underwater Treasures will air on two consecutive Wednesdays at 8 p.m. on September 20 and 27, 2006 on PBS. Visit the website for more information and downloadable lesson plans.
http://www.pbs.org/oceanadventures

America's WILD READ
America's WILD READ is a virtual book club meant to engage and inspire participants to connect with the outdoors and nature. The goal is to bring together the interested conservation community, young adult readers, and the Fish and Wildlife Service around a common book and essays in order to deepen the conversation for the National Wildlife Refuge visioning process.
http://wildread.blogspot.com/

American Field Guild
PBS has collected over 1400 video clips that enable you to experience America's wilderness firsthand. Browse through their selections on animals, ecosystems, plants, and more. Hike the Tijuana Estuary, go on a whale watch, or follow Glacier Bay rangers perform their unique duties in some of the world's most beautiful surroundings. Teacher resources include lesson plans that weave segments of video together into units of inquiry around specific topics.

http://www.pbs.org/americanfieldguide//index.html

American Indian Tribal Portal
The American Indian Environmental Office developed this tribal portal to help American Indian communities and supporters locate tribal related information within EPA and other government agencies. The website offers links to basic information, grants and funding, laws and regulations, programs, and contact. News, maps, education and training, and more are also available.
http://www.epa.gov/tribalportal/

American Mathematical Society Books Online
The American Mathematical Society (AMS) is developing the AMS Books Online website, with works originally published by the AMS. The books can be browsed by author or subject, and users can download individual chapters from each book. There are plans to add more books to the site periodically.
http://www.ams.org/online_bks/onbk_list.html

American Museum of Natural History: Climate Change
This online exhibit from the American Museum of Natural History on climate change offers interactive features that mirror the in situ exhibits, complete with charts, informative text, photographs, and graphs. There are resources, the *Signs of Change* blog, and sections for Educators and for Kids.
http://www.amnh.org/exhibitions/climatechange/?src=h_h

American Museum of Natural History Science Bulletins
The American Museum of Natural History's Science Bulletins are online videos which feature the latest developments in the fields of astrophysics, human biology, biodiversity, and evolution. The website offers additional resource links, educator resources, and an educators' guide to help incorporate the materials into classroom work. The bulletins are categorized in sections that include Astro, Earth, Bio, and Human, with further subcategories of features, visualizations, and snapshots.
http://www.amnh.org/sciencebulletins/

American Nuclear Society Blog
The ANS Nuclear Cafe blog site offers headlines, news and updates, links to resources, and more.
http://ansnuclearcafe.org/fukushima/

American Samoa and the Pacific Remote Islands Expedition
Follow the scientists and crew of the NOAA Ship *Hi'ialakai* as they head into the Pacific to explore the coral reef ecosystems of The Phoenix Islands, American Samoa, and the Line Islands, starting January 21, 2010. The three month expedition to Johnston Atoll, Howland and Baker Islands, American Samoa, Jarvis Island, Palmyra Atoll, and Kingman Reef will be the fifth biennial Pacific Reef Assessment and Monitoring Program expedition to American Samoa and the seventh to the Pacific Remote Island Areas.
http://asramp10.blogspot.com/

American Trails International Trails Symposium
The educational sessions at the American Trails International Trails Symposium covered the world of trails, from concepts to construction to promotion. The symposium included

in-depth Core Tracks, Featured Workshops, Mobile Workshops, Concurrent Sessions, and more. Read about sessions, presenters, and view some of the presentations online.
http://americantrails.org/2013/concurrent.html

American Trails Magazine Online
American Trails Magazine has gone digital. Check out the latest issue in its quick-loading, page-turning format. The format also offers a search feature and the ability to print the issue for those who prefer to pass the paper around.
http://www.myvirtualpaper.com/doc/americantrails/Spr09ATM/2009040801/

American Wetlands Month
May is American Wetlands Month; this year's theme is *It Pays to Save Wetlands*. The Environmental Protection Agency partners with other federal, state, and local agencies and private organizations in celebration. Events are scheduled across the country to educate, involve and engage Americans who want to better understand the value of one of Earth's most important ecosystems.
http://www.epa.gov/owow/wetlands/awm/

American Zoo and Aquarium Association National Awareness Campaign
AZA's National Awareness Campaign will create a unified voice to position the collective member institutions in the minds and hearts of the public as safe and fun family experiences that are also meaningful. They aim to be perceived as trusted experts and a powerful collective voice on animal care, wildlife conservation, and public education about wildlife and wild habitats.
http://www.aza.org/Publications/2004/03/March04NACTheme.pdf

America's Climate Choices
The National Academies have launched America's Climate Choices, a suite of studies designed to inform and guide responses to climate change across the nation. Experts representing various levels of government, the private sector, nongovernmental organizations, and research and academic institutions have been selected to serve on four panels and an overarching committee.
http://www.americasclimatechoices.org/index.shtml

Americans' Knowledge of Climate Change
Americans' Knowledge of Climate Change was conducted by the Yale Project on Climate Change Communication and funded by the National Science Foundation as part of the Communicating Climate Change Initiative. The report results from a national study of what Americans understand about how the climate system works, and the causes, impacts, and potential solutions to global warming.
http://environment.yale.edu/climate/

AmeriCorps Signature Project with Coastal America
AmeriCorps National Civilian Community Corps has selected Coastal America for its Signature Project for 2005/2006. Coastal Ecosystem Learning Centers are developing project proposals that involve AmeriCorps conservation corps volunteers in their Learning Center and community programs. Coastal America's federal partners are also submitting proposals through their regional implementation teams.
Contact Marguerite Duffy at marguerite.duffy@usda.gov

Amphibian Alert! Curriculum
This downloadable curriculum aims to teach children what amphibians are and why amphibian population declines are important to scientists and communities throughout the world. The curriculum targets age groups from grades 2-5 but is adaptable to other grades.
http://eeingeorgia.org/net/content/go.aspx?s=67749.0.68.4863

Amphibian Poster
Omaha's Henry Doorly Zoo, together with other zoos and organizations, has launched the Amphibian Conservation Initiative to address amphibian extinctions on a global scale. A downloadable poster includes activities on the back.
http://www.omahazoo.com/exhibits/index.asp?page=/exhibits/amphibiancrisis.htm

AmphibiaWeb
AmphibiaWeb is an online system created in conjunction with the Digital Library Project at the University of California, Berkeley, enabling search and retrieval of information relating to amphibian biology and conservation. Their goal is to establish a "home page" for every species of amphibian in the world; they hope to accomplish this with the help of volunteers and specialists. The website offers general background information about amphibians, species vulnerability, links to additional websites, and more.
http://elib.cs.berkeley.edu/aw/index.html

AMSER Science Reader Monthly
The AMSER (Applied Math and Science Education Repository) Science Reader Monthly aims to provide educators with information about a particular topic related to applied math and science by combining freely available articles from popular journals with curriculum, learning objects, and web sites from the AMSER portal. The AMSER Science Reader Monthly is free to use in the classroom and educators are encouraged to contact AMSER with suggestions for upcoming issues.
http://www.amser.org/AMSER--ScienceReader.php

An Inconvenient Truth DVD for Teachers
50,000 copies of the documentary about global warming, *An Inconvenient Truth*, were donated on a first come, first serve basis to teachers across the country interested in using the film as a teaching tool in classrooms. A free curriculum guide is also available for download on the website. The website also hosts teacher comments about the materials by way of a blog.
http://www.participate.net/educators/

Anatomy of Sea Turtles
The Anatomy of Sea Turtles is available for downloading in English and Spanish. The manual provides background information, reference photos of normal anatomy, and diagrams. Species identification, standard dissection techniques, standard measurements, and basic anatomy are covered with a diverse audience in mind. Hard copies in English are no longer available, and only a limited number of Spanish hard copies remain.
English http://www.sefsc.noaa.gov/PDFdocs/TM_470_Wyneken.pdf
Spanish http://www.sefsc.noaa.gov/PDFdocs/TM_470_Wyneken_spanish.pdf

And the Winners Are...Ocean Art
The Hawaiian Islands Humpback Whale National Marine Sanctuary has posted the winners from the 2009 Humpback Whale Month Ocean Contest. Winning art, poetry, and essays from the K-8 participants can be found on the website. Perhaps these will inspire additional waves of young poetry, story-telling, and artistry?
http://hawaiihumpbackwhale.noaa.gov/news/stories/newsocwinners09.html

Animal Diversity Web
The Animal Diversity Web is an online database of animal natural history, distribution, and classification sponsored by the University of Michigan with thousands of individual species accounts. Each account may include such features as extended descriptions, pictures of each species, and recordings of sounds and short movies. The site has a virtual museum which includes a number of representative photographs of various animal species, and several hundred virtual reality movies of skulls.
http://animaldiversity.ummz.umich.edu/site/index.html
http://animaldiversity.org/

Animal Sounds from the Macaulay Library
The Macaulay Library (formerly the Library of Natural Sounds) is the world's largest archive of animal sounds. The library is a principal source of sound recordings for basic research, education, conservation, habitat assessment, media, and commercial projects. The Library also archives and preserves an exhaustive sampling of the behaviors of each animal species using digital video and audio recordings. Their marine collection includes over 3000 recordings. http://www.birds.cornell.edu/MacaulayLibrary/About/

Animal Welfare Information Center
The USDA's Animal Welfare Information Center website contains everything from current animal issues to workshops for those in industries that utilize animals to licensing forms. Specifically, the center is designed to regulate and improve care of animals in research, testing, teaching, and exhibition.
http://awic.nal.usda.gov/nal_display/index.php?info_center=3&tax_level=1

Animals in Curriculum-based Ecosystem Studies
Animals in Curriculum-based Ecosystem Studies (ACES) is a classroom based curriculum program in which students use Earth imagery to explain the movement of animals that are tracked by NOAA's operational satellites. Follow seabirds, sea turtles, marine mammals, and fish as they migrate. Students study aspects of the animal's life history, conservation status, food web, connections to ocean processes and remote sensing data, environmental issues the animals face, and more.
http://www.signalsofspring.net/aces/

Animals Inc
The Association of Zoos & Aquariums has launched this website offering news, photos, videos, and more. Check out the live cams featuring otters, a kelp forest, and more.
http://animalsinc.net/

Annenberg Learner Spotlight for Summer
The June-July issue of the *Annenberg Learner Update* focuses on the learning that happens while enjoying all that summer has to offer, including a Walk Along the Ocean, Connecting Learning with Pollinators Week (June 17-23, 2013), and more.
http://www.learner.org/about/news/updates/junjul13.html

Annenberg Media Interactives
Annenberg Media uses media and telecommunications to advance excellent teaching in American schools. This mandate is carried out chiefly by the funding and broad distribution of educational video programs with coordinated Internet and print materials for the professional development of K-12 teachers, encouraging more effective ways to share ideas and knowledge. The website includes a variety of Interactives, including Dynamic Earth, Garbage, Weather, and more.
http://www.learner.org/interactives/

Antarctica's Climate Secrets
ANDRILL's (ANtarctic geological DRILLing) website offers a set of hands-on learning activities, video podcasts, and other materials for use in the classroom or with after-school groups. The learning activities feature physical models that illustrate geologic concepts, plus a range of maps and photographs of Antarctica. The video podcasts provide background information, and an activity book offers hands-on activities.
http://www.andrill.org/flexhibit

Antarctic Journal
Allan Miller, Albert Einstein Distinguished Educator Fellow at the National Science Foundation and a NASA Educator Astronaut finalist, has returned from a tour of duty in and around Antarctica. Miller chronicled his experience in an expedition - the first of at least 30 - that allows classroom teachers to travel to field research sites in the Arctic and Antarctic and work with scientists engaged in many different types of polar research throughout the upcoming International Polar Year
http://www.polartrec.com/allanmillerjournal

Antarctic Quest Challenge
NASA Quest Challenges are free, web-based, interactive explorations designed to engage students in authentic scientific and engineering processes related to issues encountered daily by NASA personnel. Students in grades 5-14 will develop a research question and debate the value of studying the chosen Antarctic feature. Students become scientists and propose Antarctic research using a new tool called LIMA, Landsat Image Mosaic of Antarctica. The LIMA web site is designed as part of the International Polar Year to familiarize people with Antarctica, to explore the richness of its features, to learn about why Antarctica matters to us all, and to explain and demonstrate how scientists use satellite imagery to study the continent.
http://quest.nasa.gov/challenges/lima/about.html

Antarctic Summer
Two young scientists spending six months in Antarctica will share their experiences and different perspectives with students and teachers. Alex's blog is focused on the science they're doing (he recently got his Ph.D. in oceanography), while Elizabeth (a registered nurse by training) is blogging more about life in Antarctica. They are also looking for volunteer educators to help develop new activities and lesson plans in whatever subjects or grades that interest you.
http://coseenow.net/forum/?wpforumaction=viewforum&f=4.0
http://rucool.marine.rutgers.edu/antarctica/

Antarctica Melting: A Story in 4 Acts
COSEE-NOW offers *Antarctica melting: A Story in 4 Acts*, a four-part audio slideshow series with an accompanying lesson plan on the role that global climate change has had in transforming the Antarctic ecosystem, as seen through the eyes of three scientists. Each episode includes an accompanying lesson plan to help students learn how all aspects of Antarctic's environment are connected.
http://coseenow.net/blog/antarctica-melting/

Antarctica: Signs of the Great Thaw
The Chicago Tribune offers this portrait of the effects of global warming on and around Antarctica. Visitors can view the ways in which the thawing sea ice is taking its toll on the Adelie penguins, learn about how scientists are attempting to reconstruct the history of various global climate changes, take a 360-degree look around the South Pole, and listen to the voices of people who live and work on Antarctica.
http://www.chicagotribune.com/news/nationworld/chi-antarcticamain-html,1,567386.htmlstory

Applied Environmental Education and Communication
Applied Environmental Education and Communication is an international peer-reviewed quarterly for both academics and practitioners. It features articles, a discussion and editorial section, and books and materials reviews. A special themed issue on environmental education and communication for biodiversity will be published in 2004.
http://www.aeec.org/submission/submission.asp .

Applied Math and Science Education Repository
Internet Scout offers the Applied Math and Science Education Repository (AMSER). AMSER serves up information about applied math and science resources in an easy-to-use format. Users can find a wide assortment of materials, from large web sites focusing on an individual applied science or math topic to animations that demonstrate specific science or math principles in action.
http://amser.org

Apps for Ocean Conservation and Management - on Video
The EBM Tools Network recently profiled a number of mobile apps that demonstrate how apps can facilitate ocean conservation and management. A number of these are demonstrated through short videos. Learn about a variety of ways stakeholders and citizen scientists can get involved with ocean conservation and management.
http://openchannels.org/software-tools/apps-ocean-conservation-and-management-video

Apps for Ocean Management and Conservation
This blog entry on OpenChannels offers a list of apps which can promote ocean health and sound ocean resource management. In general, the apps make existing analytical and visualization capabilities more readily available to new users and users in the field. In addition, the features of mobile devices open up new opportunities for collecting and sharing data and information, particularly between communities/stakeholders and managers.
http://openchannels.org/apps-ocean-management-and-conservation

Aquaculture Technologies Handbook
A new handbook, *New technologies in Aquaculture: Improving Production Efficiency,*

Quality and Environmental Management, reviews recent advances in improvements in aquaculture production, discusses key health issues, and more. Check out the summary and contents on this website.
http://www.aquaculturehub.org/group/books/forum/topics/new-technologies-in

Aquaculture Report
The World Resources Institute and partners released Improving Productivity and Environmental Performance of Aquaculture, the latest installment of the World Resources Report: Creating a Sustainable Food Future. It examines aquaculture's environmental footprint, profiles case studies of improvements in productivity and environmental performance, and more.
http://www.wri.org/publication/improving-aquaculture

Aquakids
The premise of this half-hour TV show is that by using young people, the "Aqua Kids", to teach other young people about the diversity and beauty of the marine environment and its potential destruction by pollution and carelessness of human populations, they can spread the message of ocean preservation to their peers. Each episode presents a lesson on conservation of the water environments of the world.
http://www.aquakids.tv/index2.html

Aquapedia
The Water Education Foundation offers Aquapedia.com, an interactive online water encyclopedia that provides information on topical water issues. Resource articles are vetted by the Water Education Foundation and supplemented with photos, graphics, videos, maps and other online tools.
http://aquapedia.com/

Aquarium Field Trips - Online
The Aquarium of the Pacific offers interactive, educational videoconferencing programs for those unable to travel to the aquarium.
http://www.aquariumofpacific.org/education/yourfieldtrip/outreach/videoconf

Aquarium Lecture Series - Massachusetts
The New England Aquarium offers a free lecture series in Boston, Massachusetts; registration is requested. Upcoming lectures cover sea-level changes, penguins, sea turtles, and more. Archived lectures are available online through WGBH.
http://www.neaq.org/education_and_activities/programs_and_classes/aquarium_lecture_series/index.php

Aquarium of the Pacific Celebrates Halloween
Discover the creepy creatures lurking in the depths of the Pacific at the Scarium of the Pacific, October 23 and 24, 2004, Long Beach, California. Pick up the creepy creature map/scavenger hunt at the aquarium information booth to begin your haunted holiday. The first 4,000 children through the door received a special Scarium of the Pacific souvenir. Check out the Aquarium of the Pacific's many educational programs.
http://www.aquariumofpacific.org/NEWS_EVENTS/10_04/scarium04.htm .

Aquarium of the Pacific's Lecture Series
Aquarium of the Pacific offers a live lecture series and posts archived videos from the 2008 and 2009 lectures; this year's series will be added. Each lecture video is accompanied by a short video in which the guest speaker talks about herself/himself.
http://www.aquariumofpacific.org/multimedia/video/

Aquarius 2010: If Reefs Could Talk
From October 12-21, 2010 you can find out what it would be like to live underwater, by tuning in to daily broadcasts live from Aquarius, the undersea research lab located off the coast of Key Largo in the Florida Keys National Marine Sanctuary. *Aquarius 2010: If Reefs Could Talk* offers lesson plans, meet the team, and more. The information will be archived if your schedule doesn't permit watching the live broadcasts.
http://isc.gso.uri.edu/oceanslive

Aquarius Mission
Follow along with the upcoming launch of the Aquarius/SAC-D satellite, being developed by NASA and the Space Agency of Argentina. Aquarius will measure sea surface salinity to provide the global view of salinity variability needed for climate studies. Check out the educational resources and more.
http://aquarius.gsfc.nasa.gov/

Aquarius Reef Base Mission
Follow along July 16-21, 2012 as a dedicated IMAX and digital media team from One World One Ocean produces live programming direct from the undersea habitat. Scientists will investigate the biology of corals and sponges on the reef, while one of the behind-the-scenes stories will explore what it's like to spend a week 60 ft below the surface. This marks the last scheduled mission to Aquarius, located in the Florida Keys National Marine Sanctuary; Aquarius is scheduled for closure due to budget cuts.
http://www.oneworldoneocean.org/

Aquarius Sea Surface Salinity from Space
The Aquarius satellite education pages offer information and activities about the surface salinity of the global ocean. The materials are designed to demonstrate how monitoring changes in salinity patterns can help us better understand connections between the water cycle, ocean circulation, and climate. Check out these activities, webinars, and more.
http://aquarius.umaine.edu/cgi/education.htm

Aquarist Journals Online
Advanced Aquarist and *Reefkeeping* are online magazines for marine aquarists, offering articles for aquarists from beginners to advanced. Check out Reefkeeping's Top Ten.
http://www.advancedaquarist.com/
http://reefkeeping.com/

Aquatic Food Webs
This NOAA Education Resources website offers an exploration of aquatic food webs. The website offers videos, lesson plans, and data sets. Check out the Real World Data investigations, Who's Eating Whom, and more.
http://www.education.noaa.gov/Marine_Life/Aquatic_Food_Webs.html

Aquatic Insects
This educational video on aquatic insects and stream ecology is produced with the elementary/middle school age group in mind and breaks down simple concepts about what aquatic insects are and their vitality in stream ecosystems. There are some cool facts that will keep kids' attention. For more videos, search "naturalist outreach" in the YouTube search field.
https://www.youtube.com/watch?v=-qSNXRxJWTc&feature=youtu.be

Aquatic Invasions
Aquatic Invasions is an open access, peer-reviewed international journal focusing on biological invasions in inland and coastal waters of Europe, North America, and other regions. The journal provides the opportunity for publication of first records of aquatic invaders and other relevant information needed for risk assessments and early warning systems.
http://www.aquaticinvasions.net/

Aquatic Invasive Species: An Educator's Information and Materials Guide
This guide is a compilation of selected educational materials on aquatic invasive species, including curricula, posters and print materials, videos, books and compact discs, and web sites. The guide is available for down-loading at http://www.seagrant.umn.edu/exotics/ais_guide.pdf . But for more information, make sure you check out the rest of this extensive website, at http://www.seagrant.umn.edu/exotics/ .

Aquarium Video Library - Online
The Monterey Bay Aquarium Website Video Library includes over 30 videos about animals, exhibits, and conservation research programs at the aquarium. The videos are in QuickTime© or Windows Media Player©. The site also offers activities, materials for the classroom, and marine science career information.
http://www.mbayaq.org/efc/video_library/video_library.aspx

ARC Centre
The ARC Centre of Excellence for Coral Reef Studies undertakes integrated research for sustainable use and management of coral reefs. This research center is headquartered at James Cook University, in Townsville, Australia. The website includes links to hundreds of coral-related publications, many with full text available. Check out the educational resources links.
http://www.coralcoe.org.au/index.html

ARC Center of Excellence for Coral Reef Studies
The ARC Centre of Excellence for Coral Reef Studies in Cairns, Australia, has been awarded a further seven years of funding by the Australian Research Council, for 2014-2020. The center will be reorganized into three Research Programs - People and Ecosystems, Ecosystem Dynamics: Past, Present and Future, and Responding to a Changing World. They will be recruiting Fellows and offering new scholarships for postgraduate students; watch for updates . Check out the education resources, also.
http://www.coralcoe.org.au/

Archaeology Channel Video Guide
Based in Oregon, The Archaeological Legacy Institute was founded to bring the benefits of archaeology to a wider constituency. Check out their collection of video programs,

which include Queen Anne's Revenge Overview, The River has Many Stories, The Shipwreck at Playa Damas, and many more. In addition to the videos, each offers web links for further information. While on the website, check out the extensive links to teacher resources and lesson plans from the main Archaeology Channel webpage.
http://www.archaeologychannel.org/content/videoguide.asp

Archeology and Ethnography Program
The National Park Service Archeology Program has launched a series of new webpages. "The Public Benefits of Archeology" offers a unique perspective for different segments of the public. Through narrative scenarios, case studies, and additional reading, visitors to the webpage can learn about ways that archeology can benefit them. The website includes links for teachers and kids, lesson plans, distance learning, and career information.
http://www.cr.nps.gov/aad/PUBLIC/INDEX.HTM

ArcGIS Online
Field data from water quality to tree species to wildlife sightings can be mapped and analyzed within a web-based Geographic Information Systems (GIS) mapping environment. ArcGIS Online is available for free online and allows users to upload data, map it, and more. Check out the featured maps and apps.
http://www.arcgis.com/home/

Archipelago Exhibit – Hawai'i
"Archipelago: Portraits of Life in the World's Most Remote Island Sanctuary" will be on exhibit at the Maui Ocean Center for the month of February. This photographic exhibit on the flora and fauna of the Northwest Hawaiian Islands and conservation efforts to protect them showcases images from the new book "Archipelago" by photographers David Liittschwager and Susan Middleton.
http://www.mauioceancenter.com/home.html

Archeology Twitter Feed
The NPS Archeology twitter feed highlights projects, accomplishments, and news items related to archeology in national parks, other federal archeology projects, and general interest archeology news. It emphasizes content related to archeology performed in parks, with NPS funds, or by NPS personnel.
http://twitter.com/NPSArcheology

ArcLessons
ArcLessons is a resource hosted by ESRI to share lessons for using GIS in the classroom. Visitors can browse a list of lessons by category or use the search tools to find lessons in a specific area of interest, including Life/Environmental Sciences. Teachers can also contribute lessons for other educators to use.
http://edcommunity.esri.com/arclessons/arclessons.cfm

Arctic and Antarctic
This NSF website looks at research being conducted in the two polar regions of the earth. These inhospitable environments provide natural laboratories for scientists to study basic questions such as, Is earth's climate changing? What are the limits of life in extreme environments? The website includes interactives about ongoing and future research along with links to classroom resources.
http://nsf.gov/news/overviews/arcticantarctic/index.jsp

Arctic and Antarctic Activity Book
NOAA's National Centers for Coastal Ocean Science offers the Arctic and Antarctic Activity Book in their ongoing series of regional children's activity books. This activity book, produced for the International Polar Year of 2007-2008, is for K-5th graders. The 25 page book is filled with information about both poles, along with facts, drawings, mazes, find-a-word puzzles, connect-the-dots, and other activities about organisms and life in the coldest areas of the world.
http://www.coastalscience.noaa.gov/education/welcome.html

Arctic Climate Connections
The folks at CIRES (Cooperative Institute for Research in Environmental Sciences) have a new education program, Arctic Climate Connections: Using Authentic Climate Data in the Classroom. This suite of activities is designed to engage high school students in climate science through an ongoing Arctic research project. Educators can use the entire curriculum or select the components best suited to their audience. All activities include student materials, a teacher's guide, assessment ideas, and more.
http://cires.colorado.edu/education/outreach/ICEE/arcticclimate/index.html

Arctic Report Card
NOAA and its partners have released their annual assessment of physical and biological systems in the Arctic. The report details the status of snow cover, sea ice, air temperature, ocean temperature, black carbon, the Greenland ice sheet, vegetation, fish, and wildlife in the Arctic.
http://www.arctic.noaa.gov/reportcard/

Arctic Report Card
NOAA offers the extensive website, Arctic Theme Page with a link to the Arctic Report Card: Update for 2012, Tracking recent environmental changes. Explore the site to read about marine ecosystems, sea ice and ocean, and more. Check out the report card, image galleries, and much more.
http://www.arctic.noaa.gov/

Arctic Studies Center
The Smithsonian Institution hosts this virtual museum exhibit on Arctic cultures, and offers the center's newsletter, field reports, and staff research. Check out the multimedia exhibitions under Features.
http://www.mnh.si.edu/arctic/

Arctic Theme Page
NOAA's Arctic Theme Page provides access to Arctic data and information for scientists, students, teachers, academia, managers, and others. The Gallery links to images of ice, animals, ships, and more. Links to education include an arctic primer, information abuot arctic change, polar ecosystems, glaciers, and much more. Check this site out for FAQs, data, maps, information, and images.
http://www.arctic.noaa.gov/index.shtml

ARKive Education
ARKive Education's free resources can be used to teach a range of curriculum subjects including science, geography, art, and more. Categorized by age, they offer links to

wildlife photos, videos, and fact files. The resources includes classroom presentations, activities, and teachers' notes.
http://www.arkive.org/education/

ARKive – Images of Life on Earth
ARKive gathers together into a centralized digital library films, photographs, and audio recordings of the world's species, creating a record of the world's biodiversity. The website features photographs of endangered and protected species worldwide, and includes information on habitat, status, descriptions, threats, and biology. It also features lesson plans (UK standards).
http://www.arkive.org/ .

ARKive School Museum
The ARKive School Museum encourages students to get creative. By discovering fascinating biological facts about endangered species, designing and creating interactive exhibits, and hosting hands-on activities in their own 'museum', students improve their scientific literacy and develop cross-discipline skills. Check out the teaching resources developed for 5-7 year olds.
http://www.arkive.org/education/resources

ARKive and Universities Scheme
ARKive is giving university students of relevant subjects the opportunity to research and write ARKive species profiles as part of the ARKive and Universities Scheme. The writing of ARKive species profiles gives students the opportunity to put their scientific writing skills into practice, further develop the research and writing skills they have gained throughout their studies, and see their work published on ARKive's website. The current need is for profiling threatened and endangered species in the U.S.
http://www.arkive.org/about/universities.html

Armada Project Classroom Activities
The Armada Project, funded by the National Science Foundation, provides K-12 teachers an opportunity to actively participate in ocean, polar, and environmental science research. Their website offers downloadable classroom activities and background information about sea level rise, population ecology, benthic infauna, and more.
http://www.armadaproject.org/downloads.htm

Art in the Park Guide
The Art in the Park Guide on the Get To Know website is a toolkit for educators and program leaders. There are 27 art-based activities designed to engage youth with nature, both directly - through outdoor activities, and indirectly - through activities which can be carried out anywhere that get youth thinking about their connection to the environment.
http://www.get-to-know.org/blog/best-practices/2013/4/8/80-art-in-the-park-guide/

Artist Boat
Artist Boat is dedicated to promoting awareness and preservation of coastal margins and the marine environment through collaborations between marine scientists and artists in order to develop environmental literacy. They utilize tools of the sciences and the arts to bring people to places of awareness and reflection while visiting these habitats. While

sections of their website are under development, it includes links to educational materials, a downloadable pdf of upcoming events, and youth program descriptions.
http://www.artistboat.org/

Artists for Reefs
Reef Check has partnered with artists for the online art gallery, Artists for Reefs. The main goals are to promote appreciation for the beauty and importance of marine environments among the general public, and to raise funds for reef conservation projects. The gallery includes one-of-a-kind and limited-edition art pieces featuring a variety of marine themes. Each artist has agreed to donate a portion of sales to Reef Check.
http://www.reefcheck.org/involved/iyorgallery/default.php

ARTNC (North Carolina Museum of Art)
The North Carolina Museum of Art provides online educational resources featuring nature and science activities that can be used in environmental education. The website includes K-12 lesson plans and activities searchable by region, subject, and grade. While none specifically address the marine environment, concepts include animal behavior and adaptation, weather and climate, ecosystems, and more relevant topics.
http://www.ncmoa.org/artnc/

ARTStem
The focus of this website is on teaching and learning at the intersection of the ARTS, humanities, and the STEM disciplines. The ARTStem partnership was designed to bring together faculty from the University of North Carolina and public school educators to explore the relationship between learning and teaching in the arts and STEM fields.
http://www.artstem.org/

AsapSCIENCE
AsapSCIENCE is a YouTube channel which offers weekly videos touching on different topics of science. Check this out when you've got time to listen online.
https://www.youtube.com/user/AsapSCIENCE

Ask Dr. Global Change
From the U.S. Global Change Research Information Office, "Dr. Global Change" offers a searchable collection of answers to questions about global warming, ozone depletion, greenhouse gases, and other issues related to climate change. Students can also submit questions of their own and explore related links. This reference service also assists researchers, educators, resource managers, and others in finding information relevant to global environmental change.
http://gcrio.custhelp.com/cgi-bin/gcrio.cfg/php/enduser/home.php .

Ask an EPA Scientist
It All Starts with Science, an EPA blog about science matters, offers Ask an EPA Scientist. Scroll through some of the other blogs, including Around the Water Cooler features, This Week in EPA Science, and more.
http://blog.epa.gov/science/2015/03/got-an-environmental-science-question-ask-an-epa-scientist/

Ask a Scientist
The Howard Hughes Medical Institute connects students to top scientists connected to the institute; students can ask scientists about medicine, human biology, animals, biochemistry, microbiology, genetics, or evolution.
http://www.hhmi.org/askascientist/

Assessing and Monitoring Floatable Debris
Assessing and Monitoring Floatable Debris is designed to provide guidance in assessing and monitoring floatable debris as directed by the BEACH Act of 2000. A copy of can be found on EPA's website.
http://www.epa.gov/owow/oceans/debris/floatingdebris/

Astrobiology in the Classroom
While Astrobiology in the Classroom leads students in the exploration of the limits of life on Earth to extend their beliefs about life to include its possibility on other worlds, these units can easily be adapted for other studies. In this four-part activity, students first explore the environments of several mammals and birds to better understand how living things and their environments interact and depend on each other. In the second part, students match bacterial types with their more extreme environments.
http://btc.montana.edu/ceres/astrobiology/LabActivities/ExtremeEnvironments.doc

At Sea – A Cruise and Virtual Expedition to the Oculina Banks
Scientists and students explored deepwater coral reefs of the Oculina Banks, stretching 30 miles offshore from Ft. Pierce to Cape Canaveral, Florida. This remote MPA is designated a habitat of particular concern, and is a model for efforts underway to create new MPAs throughout southeast U.S. waters and the Gulf of Mexico. The team used a Remotely Operated Vehicle to study the current health of coral on the banks.
http://oceanica.cofc.edu/Oculina2003/home.htm

At Sea Newsletter
The University of Delaware College of Marine Studies and the Delaware Sea Grant College Program have launched a new e-newsletter, At Sea. It provides information on the marine research, education, and outreach activities at the University of Delaware. The website also has links to educational resources.
http://www.mis4.udel.edu/deptnews/deptnews.html?3501 .

At Work in the Ocean
This CD-ROM contains material mapped to science standards created during a series of live interactive Internet events and from education and outreach material developed during the 1999 and 2000 field seasons of the National Geographic Society's Sustainable Seas Expeditions. The three curriculum units on this CD feature clips, web chat questions and answers, labs, activities, and related resource materials. The units are monitoring a habitat, tools for exploring the ocean, and oceanography careers.
http://www.dlese.org/dds/catalog_NASA-ESERevProd374.htm

Atlantic Canyons Undersea Mapping Expeditions Project
The NOAA Ship Okeanos Explorer operated in the North Atlantic Ocean between Cape Hatteras, North Carolina, and the U.S.-Canadian territorial boundary November 2-30, 2012. The expedition focused on supplementing Northeast canyon and continental slope mapping efforts carried out during previous cruises as part of NOAA's Atlantic

Canyons Undersea Mapping Expeditions (ACUMEN) project. Check out the project summary, background essays, and more.
http://oceanexplorer.noaa.gov/okeanos/explorations/acumen12/summary/welcome.html

Atlantic Coastal Fish Habitat Database
NOAA's National Centers for Coastal Ocean Science has recently launched a tool linking various bibliographic resources to their corresponding geographic area. The web-based tool links standard bibliographic and relevant assessment information within a spatial framework to corresponding fish habitats. This approach is also unique in that it provides summaries of habitat condition, indicators of threats to habitats, and recommendations on conservation efforts for the selected area.
http://www8.nos.noaa.gov/bhv/spatbibindex.html

Atlantic and Gulf Rapid Reef Assessment Database
The Atlantic and Gulf Rapid Reef Assessment (AGRRA) database is now available in Microsoft Access©. The database hosts data for 737 sites that were surveyed during the 35 assessments conducted between 1997 and 2003 in the Caribbean, Gulf of Mexico, Florida and the Bahamas.
http://www.agrra.org/

Atlantic and Gulf Rapid Reef Assessment Program Report
The Atlantic and Gulf Rapid Reef Assessment (AGRRA) Program is a joint program of the University of Miami's Rosenstiel School of Marine and Atmospheric Science and The Ocean Research and Education Foundation. A comprehensive survey of coral reefs in 20 areas of the Western Atlantic can be used to compare the current health of one reef to that of another, and to evaluate future changes.
http://www.coral.noaa.gov/agra/index.html

Atlantis Expedition AT18-07
Join researchers on the R/V *Atlantis*, June 26-July 14, 2011 off the west coast of the United States as they explore how water flows in the earth's crust beneath the seafloor, and examine geochemistry, rock alteration, and microbes living in the seafloor. The education program will focus on the nature and process of science - how we ask questions, test ideas, gather data, problem-solve, circle back to new questions and collaborate with scientists around the world in the service of transformative research.
https://spreadsheets.google.com/spreadsheet/viewform?formkey=dHoxdF9CUFJOSDRJRE1zNklOV3FkLVE6MA

Atlas of Extratropical Storm Tracks
From the NASA Goddard Institute for Space Studies comes information about midlatitude storm systems, including maps of storm frequency and intensity as well as plots of individual storm paths. Maps are available as monthly and seasonal means for the years 1961 through 1998 in either global or hemispheric projections.
http://www.giss.nasa.gov/data/stormtracks/

Atlas of the Biosphere
The Center for Sustainability and the Global Environment's *Atlas of the Biosphere* contains numerous maps documenting environmental phenomena across the globe, such as water resources, ecosystems, land use patterns, and human impact, at a variety of scales. The Atlas also contains the data sets that were used to generate these different thematic maps.

http://atlas.aos.wisc.edu/maps.php

Atlas of the Cryosphere
The Atlas of the Cryosphere allows visitors to explore and dynamically map the Earth's frozen regions. Viewed from a polar perspective, the available scenes include snow cover, sea ice extent and concentration, and more. The atlas also allows users to save custom maps for use as images in other documents and to view monthly climatologies to see how and where the cryosphere shrinks and grows over the course of a year.
http://nsidc.org/data/atlas/

Atlas of Our Changing Environment
One Planet, Many People: Atlas of Our Changing Environment, from the United Nations Environment Programme (UNEP), provides a comparative picture of our environment 30 years ago with the present day. The atlas contains photographs, satellite images, maps, and narratives that provide insights into the many ways people around the world have changed, and continue to change, the environment.
http://na.unep.net/OnePlanetManyPeople/index.php

Atlas of Science Literacy
The Atlas of Science Literacy is a two-volume collection of conceptual strand maps, and commentary on those maps, that show how students' understanding of the ideas and skills that lead to literacy in science, mathematics, and technology might develop from kindergarten through 12th grade. The atlas is part of a coordinated set of tools developed by the American Association for the Advancement of Science's Project 2061, to help educators understand and use specific goals for student learning.
http://www.project2061.org/publications/atlas/default.htm

Atlas of Wetlands in the St. Lawrence Valley
The *Conservation Atlas of Wetlands in the St. Lawrence Valley* from Environment Canada, an interactive GIS mapping site, pinpoints the location of some 20,000 wetlands. It provides definitions of the various wetlands and their roles, statistical and descriptive data for specific areas, and conservation options. Users can create their own maps from the original database.
http://lavoieverte.qc.ec.gc.ca/faune/AtlasTerresHumides/AtlasTerresHumides.html

Audio Guide to Urban Birds: By Students, For Students
Learn more about common urban birds with this project, written and narrated by high school students from Boston, Massachusetts. The Urban Bird Sounds Project features recordings and descriptions of birds, tips for remembering their songs and calls, and short quizzes to test your skills. The website allows you to download audio and teaching materials, take online quizzes, and more. There is also a step-by-step guide to producing a similar project.
http://www.urbanbirdsounds.org/Site/Welcome.html

Audubon Fishes of the Caribbean and Gulf of Mexico
This app helps users identify tropical fishes found in the waters of the Caribbean and Gulf of Mexico. The data includes photos, range maps, similar species, and more. The app is available for iPhone, iPad and iPod touch.
http://www.audubonguides.com/field-guides/Tropical-Fish-Identification-App.html

Audubon Lesson Plans On-Line
Wild Republic's Learning Adventure features lesson plans about nature, animals and their habitat; this year's focus is on birds. Educators at Audubon provided the necessary content for the 2003-2004 lesson plans, including Puffins, upwelling, coastal food webs, and more. Each unit is designed to enrich students' knowledge and understanding of birds, their characteristics and habitats.
http://www.wildrepublic.com/lessonplans/2003/index.html .

Australian Antarctic Magazine
The online version of the Australian Antarctic Magazine is part of an Australian government website that supports and informs the public, scientists, researchers, and lawmakers about the involvement of Australia in the Antarctic region. The magazine comes out twice yearly, and archived issues are available on the website. Sections of the magazine include Science and Policy, Marine Mammal Science, and Working in Antarctica.
http://www.aad.gov.au/default.asp?casid=2006

Australian Biological Resources Study
The mission of the Australian Biological Resources Study is to document which plants and animals are found in Australia, map their locations, and provide information this information to the general public. The website includes material on research activities and administration, and offers a series of online databases, including fauna, flora, species bank, and more.
http://www.deh.gov.au/biodiversity/abrs/

Australian Marine Environment Protection Association Educational Materials
The Australian Marine Environment Protection Association offers a variety of educational web pages and materials. Topics include marine stormwater pollution, the effects of climate change on coral bleaching, marine pest and threat, and much more. Check out the flash versions and downloadable teacher resources.
http://www.ausmepa.org.au/home/

Australian Museum Online
The Australian Museum has a long tradition of educational outreach; this website affords users access to materials created for this website and materials culled from *in situ* exhibits. The *Features* section contains exhibits ranging from explorations of the Great Barrier Reef to everything you want to know about sea slugs. *Explore* allows users access to fact sheets and educational materials. *Research and Collections* offers users the ability to learn more about the museum's different departments, including marine ecology, biodiversity, fishes, and much more.
http://www.amonline.net.au/

AUVfest 2008 – Online
AUVfest 2008 took place May 12-23, 2008, hosted by and based at The Naval Undersea Warfare Center in Newport, Rhode Island, co-sponsored by the Office of Naval Research and NOAA's Office of Ocean Exploration and Research. This was a unique opportunity to demonstrate and test the applications of autonomous underwater vehicles for both mine countermeasures and archaeological research. Check the website for lesson plans (Grades 5-12), videos, background information, and more.
http://oceanexplorer.noaa.gov/explorations/08auvfest/welcome.html

Avian Index
Teachers, students, and others can find useful resources through the Avian Index, from Environment for the Americas. Curriculum, workshops, books, speaker's lists, and more, are available through this easy-to-search database.
http://www.birdiq.com/learn/Resource_Dir/index.php#

Avibase – The World Bird Database
Avibase is an extensive database information system about birds of the world, containing over 1.4 million records about 10,000 species and 22,000 subspecies of birds, including distribution information, taxonomy, conservation status, and more. This site is hosted by Bird Studies Canada, an affiliate of Birdlife International.
http://www.bsc-eoc.org/avibase/avibase.jsp .

Baby Grouper Adrift!
Researchers from REEF's Grouper Moon Project released satellite drifters at the largest remaining Nassau grouper spawning aggregation, and the Adrift! website will follow the location of the drifters. Scientists are studying the passive transport of Nassau grouper larvae spawned at the protected aggregation sites in the Cayman Islands to better understand the importance of place.
http://www.reef.org/programs/grouper_moon/adrift/

Back the Brookie Learning Module
The *Back the Brookie* Learning Module was created by Tennessee educators and includes a DVD and teacher packet for use in grades 7-12. The module helps students learn about clean air and clean water, and their effects on brook trout habitat as well as on humans. It includes information on brook trout biology, watersheds, acid rain, the water cycle, pH, and how students can help participate in conservation efforts. The teacher packet is complete with a pre/post test, activity suggestions, notes, and more.
http://www.eeintennessee.org/net/content/go.aspx?s=56894.0.0.37935

Back to the Sea of Cortez: Sailing with the Spirits of John Steinbeck and Ed Ricketts
A team of scientists will embarks on a 73-foot fishing boat to retrace the historic expedition that John Steinbeck and Edward F. "Doc" Ricketts made to explore the Sea of Cortez in 1940. Their journey was immortalized in a book they wrote together, *The Log from the Sea of Cortez*. A science writer will travel with the expedition and post a daily log of the journey online. Students and teachers in Baja California will join the expedition for different days of studying life in the tide pools.
www.seaofcortez.org and www.mardecortes.org .

Backyard Bird Checklists
The Great Backyard Bird Count checklist has interactive links to pictures and facts about the birds most likely to be found in your zip code or other identified location. The checklist is specially prepared for February sightings but can be very useful to help identify common birds you might see in your neighborhood.
http://gbbc.birdsource.org/gbbcApps/checklist.

Bad Science
This website identifies some scientific phenomena which are persistently presented incorrectly by teachers and writers, and provides scientifically correct explanations. The author hopes "to sensitize students, teachers, and writers to the horrors of such glib

explanations or representations." The website includes Bad Meteorology, Bad Chemistry, and more.
http://www.ems.psu.edu/~fraser/BadScience.html

Balance in the Bay
This activity from the Voices of the Bay module from NOAA's National Marine Sanctuaries explores how population dynamics, environmental variability, and fishing regulations relate. Students take part in a simulated fishery, harvesting California Market Squid. The online materials include standards, resources, evaluation materials, and more.
http://sanctuaries.noaa.gov/education/voicesofthebay/teachingmaterials/balance.html

Baltimore Harbor Celebration – Maryland
The Star-Spangled Spectacular festival celebrates the 200th birthday of the national anthem, September 10-16, 2014 in Baltimore, Maryland. NOAA vessels, including the Okeanos Explorer, will be in Baltimore Harbor along with tall ships, Navy gray hulls, and more. Check the website for more information. The Okeanos Explorer will be open to the public.
http://oceanexplorer.noaa.gov/okeanos/welcome.html

Banana Slug String Band
Banana Slug String Band is committed to educational entertainment for children and families through interactive music and performance. The band's *Slugs at Sea* CD correlates with the K-8 MARE (Marine Activities, Resources & Education) curriculum out of the University of California Berkeley's Lawrence Hall of Science (LHS) and their upcoming album, *Only One Ocean*, will have associated curricula through LHS and COSEE. Join the email list to get free music downloads and more.
http://www.bananaslugstringband.com/

Banana Slug String Band CD Sale
All CDs from the Banana Slug String Band are on sale. Get your presents here – including Only One Ocean, La Tierra Y El Mar, and my favorite, Wings of Slumber.
http://www.bananaslugstringband.com/#!cds/cil3

Barging Down the Mississippi
The Wyland Foundation is traveling down the Mississippi River on its third public education tour. *Barging Down the Mississippi* will take place throughout the month of October, 2006. From the headwaters of the Mississippi River watershed to the Gulf of Mexico, this program of classroom study and live events uses art as a gateway for the promotion of aquatic resource science and environmental education.
http://www.wylandoceanchallenge.org/index.cfm?do=tourabout

Barrier Island EcoTours – South Carolina
Explore South Carolina's Coastal Habitats while meeting national and state science standards. Field trips may be tailored to meet the interests and knowledge levels of students from kindergarten through college. Scientific process and inquiry skills are promoted and reinforced throughout the field trip as students learn about organisms, habitats, communities, and ecosystems, as well as the physical, chemical, geological and historical factors that influence them.
http://nature-tours.com

Barrier Islands: To Build or Not to Build?
This Internet WebQuest Science website offers a task for students along with research resources and a teacher page. Students are tasked with developing an educated opinion as to whether or not people should build permanent structures on barrier islands. They learn about the geological and physical nature of barrier islands, and how barrier islands change over time.
http://www.glencoe.com/sec/science/webquest/content/barrierisland.shtml

Battle of Hampton Roads
Sail the Book offers a new Google Earth tour of the Civil War Battle of Hampton Roads. There are links to NOAA and Mariners' Museum activities, map overlays with bathymetry and imagery interpretation, primary sources of letters from the sailors, and more.
http://www.sailthebook.net/

BatsLIVE
BatsLIVE is an education program that provides free, online resources and opportunities to learn more about bats. Check out the upcoming electronic field trip, May 17, 2012, lesson plans, web seminars, and more.
http://batslive.pwnet.org/

Battle of Midway
The U.S. Fish & Wildlife Service and Papahānaumokuākea Marine National Monument support this website as part of the memorial activities on Midway Atoll observing the 70th anniversary of the Battle of Midway. The website shares the story of the battle through a timeline, images, stories, and maps, and hopes to inspire visitors to write and share their own stories and experiences of the event.
http://www.pmnmims.org/battlemidway

Bay Backpack
The Chesapeake Bay Program launched Bay Backpack, an online resource to engage students in hands-on learning about the Chesapeake Bay and its local waterways. Bay Backpack provides educators with the necessary resources to give their students a Meaningful Watershed Educational Experience, through projects that allow students to gain a deep understanding of environmental issues in the Chesapeake Bay and its local streams and rivers.
http://www.baybackpack.com/

Bay Link
Bay Link is an educational site centered on the Chesapeake Bay estuary, the people living on its drainage area, and the effect the various natural and human forces have on the Bay. The website offers lesson plans, links to field trips, and more.
http://www.baylink.org/

The Bay Game
The University of Virginia's Bay Game simulation allows players to take the roles of stakeholders, make decisions about their livelihoods and professional expertise, and see the impacts of these decisions on the watershed and on each other over a twenty-year period. The website provides information about the simulation, along with materials on the different simulation events and the participating groups. Visitors can review the Bay Resources with links to organizations and interactive maps of the Chesapeake Bay.
http://www.virginia.edu/vpr/sustain/BayGame/

Bay Grasses in Classes
The Bay Grasses in Classes project is a joint partnership with the Maryland Department of Natural Resources and the Chesapeake Bay Foundation. Since its inception in 1998, over 1,269 classes and 32,000 students have been involved with Bay Grasses in Classes. During this time students have planted over 2.5 acres of bottom surface in the Bay with the 425,000 plants grown in their classrooms. The website includes maps, photos, and classroom activities.
http://www.dnr.state.md.us/bay/sav/bgic/grass_class.html

Bay and River Sojourns
The Alliance for the Chesapeake Bay 2009 River Sojourns are multi-day expeditions down the Patuxent, James, and Susquehanna Rivers of the Chesapeake watershed. Various trips are offered; see the website for details in upcoming days.

- Patuxent River – June 18-22, 2009
- North Branch Susquehanna – June 18-23, 2009
- Lower Susquehanna – June 24-28, 2009
- James River – July 10-14, 2009

http://www.acb-online.org/2008Sojourns.cfm

BBC Science
BBC Radio 4 offers downloadable archives of broadcasts, including a wide variety of science shows. Programs include *Arctic Meltdown*, the *Goldilocks Planet* (a search for an earth-like planet), *Wild Blue Britain* and much more.
http://www.bbc.co.uk/radio4/science/

Be Out There
The National Wildlife Federation has launched Be Out There, a national movement to return the outdoors to the nation's children. Be Out There engages families, educators, healthcare practitioners, corporate leaders, policymakers, and the media in persuading others to spend more time outdoors. The goal is to re-connect families to the outdoors to raise healthier kids and inspire a life-long appreciation of wildlife and nature.
http://www.nwf.org/beoutthere/

Be Water Wise!
National Environmental Education Week (EE Week), April 12-18, 2009, promotes the understanding and protection of the natural world by actively engaging students and educators of all subjects in a week of environmental learning and service before Earth Day. This year's EE Week theme is *Be Water Wise!* The website offers a water-themed Nature Journaling blog, lesson plans, and more.
http://www.eeweek.org/

Be Water Wise in School
Presented by The Groundwater Foundation, this newly developed guide brings education and action together. Written as a complete guide ready for implementation in the classroom, it contains background information for teachers, lesson plan instructions, pre- and post-tests, vocabulary lists, website links for further student research and service-learning project ideas. *Be Water Wise in School* is completely hands on and has been correlated to National Science Education Standards.
http://www.groundwater.org/shop/proddetail.asp?prod=1114d

Beach Chair Scientist
The purpose of this website and blog is to bring a simplified perspective to the questions one might have while relaxing on the beach. Check out What Marine Conservationists Are Into, read 10 Beachcombing Adventures, use some of the 13 apps for your day at the beach, and much more.
http://beachchairscientist.wordpress.com/

Beach Management
Beach Management, Principles & Practice, is a handbook which collects decades of research on integrated beach management. Part One covers beach management principles and theory and addresses practical management tools and guidelines, including how to determine the best management strategy for different beach types as well as how to include user preferences and priorities in effective management plans. Part Two offers case studies of best and worst practices.
http://www.earthscan.co.uk/?tabid=56717

Beach Watch
Beach Watch trains citizen-scientists to survey and document the resources of the Gulf of the Farallones and Monterey Bay National Marine Sanctuaries. As a long-term volunteer beach monitoring program, the goals of Beach Watch are to help protect and understand coastal resources. The website offers sixteen years of biological data from 41 beaches, tracking live and dead wildlife and their locations. The live bird and marine mammal data provides annual, seasonal, and geographical trends, and more.
http://www.farallones.org/BeachData/BeachWatchData.php

Beach Water Quality Monitoring System
This partnership effort between Earth 911, Oceana, and participating states and communities provides information regarding the most recent water quality conditions at local beaches. This application is currently being expanded in several communities and will soon be available nationwide. The site also provides links to learn more about beach water monitoring, waste disposal, stormwater, rip currents, and more.
http://southcarolina.earth911.org./usa/WaterQuality/index.asp

Beachapedia
The Beachapedia website from Surfrider Foundation is similar to Wikipedia, but with articles that focus on beach and ocean issues. Check out the Featured Article, State of the Beach Report, Daily Factoids, and more. Many of the pages currently offer short definitions of a topic. Help build out the pages with in-depth information; like Wikipedia, experts can contribute to the project. Make sure to contribute links to educational materials on specific subjects.
http://www.beachapedia.org/Main_Page

Beachcomber's Companion© Cards
Woods Hole Sea Grant has developed Beachcomber's Companion© cards, an alternative to the traditional field guide. The cards feature user-friendly information for 50 Atlantic coast marine invertebrates, perfect for beachcombers of all ages. The cards cover marine invertebrates common to the Atlantic Coast. They help beachcombers identify a specimen by size, shape, features, and coloration; where to look for it; and interesting facts about the creature.
www.beachcomberscompanion.net

Beaked Whale Identification Guide
From the Smithsonian's National Museum of Natural History's Marine Mammal Program comes the Beaked Whale Identification Guide, with detailed identification guides and separate pages for each beaked whale species. The website includes basic morphology, habits, and geographic distribution. In addition to references, there are links to a cetacean stranding database and more.
http://vertebrates.si.edu/mammals/beaked_whales/pages/main_menu.htm

Beall's List
Jeffrey Beall, a research librarian at the University of Colorado in Denver, has developed his own blacklist of potential, possible, or probable predatory scholarly open-access journals. Authors submitting articles to these journals may be charged a large fee following publication or encounter other unexpected problems.
http://scholarlyoa.com/individual-journals/

Becoming Whales
From the Evolution and the Nature of Science Institutes, this website contains a 45-minute lesson about evolutionary links between whales and terrestrial mammals. Experience discoveries of whale evolution, or, as the website states, "The thrill of discovery…The loss of de feet." Downloadable materials for the lesson are provided as well. The site also includes a useful collection of extensions and resources.
http://www.indiana.edu/~ensiweb/lessons/whale.ev.html

BEETLES
The BEETLES (Better Environmental Education Teaching, Learning & Expertise Sharing) project is developing a suite of resources specifically for outdoor science field instructors. By the end of the summer 2015, they expect to have 11 research-based professional learning sessions for field instructors and 25 outdoor student activities that demonstrate how the research can be put into practice in the field. All materials will be available free of cost on the website, along with a series of leaders videos.
http://beetlesproject.org/

Before and After Disasters: Federal Funding for Cultural Institutions
This guide is intended to help cultural institutions prepare for emergencies and disasters that may strike their regions. The latest version of the report, prepared by FEMA and the National Endowment for the Arts, provides summary descriptions and contact information for 15 federal grant and loan programs and additional sources of federal assistance for preparedness, mitigation, and response.
http://www.arts.gov/pub/DisasterRecovery.pdf

Before the Storm App
This free game app from Australian Emergency Management, aimed at fifth- through ninth-graders, lets kids take over a gothic mansion during four stages of a storm—preparedness, immediately before, during, and the cleanup afterwards.
http://itunes.apple.com/au/app/before-the-storm/id496753593?mt=8

Bentham Open
Bentham Publishers is launching more than 200 peer-reviewed open access journals during this year, under the banner of Bentham OPEN. The journals will cover all major

disciplines and are exclusively open access publications. Browse the subject list for Earth Science, Environmental Science, Geology, and more.
http://www.bentham.org/open/

Benthic Assemblages in the Twilight Zone Expedition
Join scientists aboard the NOAA Ship *Nancy Foster* for the Benthic Assemblages in the Twilight Zone Expedition as they embark on the expedition to characterize mesophotic benthic assemblages 50-200 meters deep in the Gulf of Mexico. They will be using the Phantom II remotely operated vehicle to collect samples on a few banks along the continental shelf break. The expedition was scheduled to start August 25 but was delayed.
http://flowergarden.noaa.gov/science/nancyfoster08.html

Benthic Ecology Webinars
COSEE Ocean Systems offers this new series of free, archived, online webinars, Beneath the Surface – Explorations in Benthic Ecology. The three-part series focuses on the ecological role and behaviors of benthic organisms; the impact from human activities on benthic systems; and the role of injury on feeding, sediment reworking, and the ecosystem as a whole. The archives include the webinar video, resources, and activities.
http://cosee.umaine.edu/programs/webinars/benthic/

Benthic Habitat Atlas of Coastal Texas
The Benthic Habitat Atlas, from the NOAA Coastal Services Center, contains shallow-water habitat information for over 190 miles of Texas coastal bays. Users can access individual maps from the website and download and print them as PDF documents. Users can also access supplemental information on data development techniques.
http://www.csc.noaa.gov/digitalcoast/tools/texasatlas/index.html

Benthic Habitats and the Effects of Fishing
This book from the American Fisheries Society Symposium 41 offers an understanding of the effects of fishing activities on benthic habitats necessary to address the issues of habitat alteration that challenge managers, practitioners, and ocean scientists. Free copies may be available while they last from the National Marine Fisheries Service, Office of Habitat Conservation; contact Dr. James Thomas at james.thomas@noaa.gov. They are available for purchase from the American Fisheries Society.
http://www.fisheries.org/html/publications/catbooks/x54041.shtml

Benthic Marine Algal Herbarium of L.I. Sound
The University of Connecticut has photographed original herbarium sheets featuring over 300 preserved benthic marine macroalgal species in the Long Island Sound. Visitors can search by phylum, family, or name. The site offers a list of definitions, and more.
http://www.algae.uconn.edu/

Bering Sea Learning Resource Collection
This collection of resources includes lesson plans developed through the collaboration of teachers and scientists involved in research during the Bering Sea Ecosystem Study, along with links to videos, visualizations, and other K-12 educational resources.
http://www.polartrec.com/collections/bering-sea-ecosystem

BerkeleyEarth Temperature Data
BerkeleyEarth.org offers this data set on land-surface temperature changes for the last 250 years. The website offers summary graphs of data along with the downloadable data.
http://berkeleyearth.org/

Bermuda Deep Water Caves 2011
NOAA's Office of Ocean Exploration and Research will launch The Bermuda Deep Water Caves 2011: Dive of Discovery Expedition website June 3, 2011. Postings will include daily logs, videos and images; an Ocean Explorer Expedition Education Module; lesson plans; and more. The expedition ran June 7-24, 2011.
http://oceanexplorer.noaa.gov/explorations/11bermuda/welcome.html

Bermuda: Search for Deep Water Caves 2009 Expedition
NOAA's Office of Ocean Exploration and Research has launched the *Bermuda: Search for Deep Water Caves 2009 Expedition* website, following the cruise that took place September 5-30, 2009. The expedition posting includes daily logs, videos and images, an Ocean Explorer Expedition Education Module, lesson plans, and more.
http://oceanexplorer.noaa.gov/explorations/09bermuda/welcome.html

The Best of CLEARING
The Best of CLEARING (Volume VI) is a unique collection of EE stories, reviews, and perspectives from 20 past issues of CLEARING: the EE resource magazine of the Pacific Northwest. The CD includes field-tested teaching ideas and strategies, K-12 activities for all subject areas, and stories from innovative EE projects and programs. Be sure to check out the free online issues of Clearing.
http://www.clearingmagazine.org/online/best-of-clearing

Best of COSEE Hand-On Activities
The Best of COSEE Hands-On Activities is now online and available as a CD. Over 50 hands-on activities have been collected from across the COSEE network and are available through a user-friendly online interface. The activities can be searched by subject, grade level, duration, and Ocean Literacy principle.
http://www.cosee.net/best_activities/

"Best" Lists
Larry Ferlazzo, a high school English Language Learners teacher in California, has compiled lists of "best" websites, including websites to introduce environmental issues into the classroom, science websites for students and teachers, articles about education, and more.
http://larryferlazzo.edublogs.org/2008/07/19/the-best-sites-to-introduce-environmental-issues-into-the-classroom/

Best Management Practices
This online book offers a guide for best practices for erosion control in the British Virgin Islands.
http://issuu.com/alookingglass/docs/best_erosion_practices-alookingglas

Best Practices in Boating, Fishing, and Aquatic Stewardship Education Tools
The Recreational Boating and Fishing Foundation developed Best Practices in Boating, Fishing, and Aquatic Stewardship Education, as well as accompanying tools to facilitate

implementation. The document includes guidelines in program development, research, and evaluation and is supported by 11 papers on topics ranging from effective minority outreach to program evaluation.
http://www.rbff.org/educational/bestpractices.cfm .

Beyond the Basics of Local Mitigation Planning
This website is designed to help guide visitors through the process of developing or updating a local hazard mitigation plan. Based on FEMA's *Local Mitigation Planning Handbook*, the website offers practical approaches and examples of how communities can engage in effective planning to reduce long-term risk from natural disasters.
http://mitigationguide.org

Beyond the Data
Climate.gov offers the blog, Beyond the Data: A blog by the nation's official climate record keepers. It will cover how climate records are collected and updated, how we know what we know about the climate, and how we can use climate information to make our communities more resilient.
https://www.climate.gov/news-features/department/beyond-data

Beyond the Moon
James Greig McCully, author of *Beyond the Moon: A Conversational, Common Sense Guide to Understanding the Tides*, offers a comprehensive explanation of the tides on earth that is both simple enough for students and solid enough for their professors. This book describes how the cyclical motion of the near solar system acts upon the earth's oceans, and how the hydraulics over the continental shelf and the geography of the coastline orchestrate this rhythm into the variety of tide patterns seen around the globe.
http://www.worldscibooks.com/environsci/6015.html

Beyond Penguins and Polar Bears
Beyond Penguins and Polar Bears, from Ohio State University and partners, is a new online magazine to help elementary school teachers develop their knowledge of the Arctic and Antarctica and organize science and literacy instruction around polar themes. Issues provide lessons and readings on data collection and representation, map skills, comparing the Arctic and Antarctica, paleontology and archaeology, and more. Book recommendations are included.
http://beyondpenguins.nsdl.org/

Beyond Weather and the Water Cycle
Beyond Weather and the Water Cycle, from Ohio State University, is an online professional development magazine which focuses on preparing elementary teachers to teach climate science concepts while integrating inquiry-based science and literacy instruction. Current materials include The Sun and Earth's Climate and Understanding Earth's Climate. Additional materials will be added.
http://beyondweather.ehe.osu.edu/

Blick on Flicks
We love watching movies, but we also love science. And sometimes the two don't mix. To help sort the good science from the bad in movies and other visual media, the NSTA website hosts audio and written reviews, providing expert commentary, pointing out where the physics is twisted, the chemistry fudged, or the biology stretched on behalf of

the story, without losing sight of the fact that movies are meant to entertain. Blick helps make "bad science" into teachable science for middle level and high school students.
http://www.nsta.org/publications/blickonflicks.aspx

Big Blue Bus from Fisheries and Oceans Canada
The Big Blue Bus is Fisheries and Oceans Canada's Kids Corner with all kinds of activities, contests, and facts. This site has features such as the Water Wizards Club, the Creature Feature, Small Fry Club, a monthly contest, vocabulary, and much more. Among the many offerings, kids can learn about clean water sources, climate change, invasive species, and marine protected areas.
http://www.dfo-mpo.gc.ca/canwaters-eauxcan/bbb-lgb/index_e.asp .

Big Blue Live from Monterey Bay National Marine Sanctuary
Watch PBS during the Big Blue Live broadcasting from Monterey Bay National Marine Sanctuary through September 2, 2015. #BigBlueLive will be a celebration of Monterey Bay, and will feature animals that come to the marine sanctuary to feed. Scientists, filmmakers, animal behaviorists, and other experts will narrate the footage. The PBS website includes livestreaming cameras from the bay and the Monterey Bay Aquarium, images, and other materials.
http://www.pbs.org/big-blue-live/home/
http://www.montereybayaquarium.org/big-blue-live
http://sanctuaries.noaa.gov/news/aug15/big-blue-live.html

Big Green Help
The Big Green Help from Nickelodeon is a global kid-led initiative that provides information and tools to help explain climate change to kids, and educates and empowers kids to make a difference by connecting them to earth-friendly activities in their everyday lives.
http://www.biggreenhelp.com/

BiG RAPA
Scientists from the Center for Microbial Oceanography: Research and Education and the Universidad de Concepción, Chile have organized an expedition the southeast Pacific Ocean. The BiG RAPA (Biogeochemical Gradients: Role in Arranging Planktonic Assemblages) expedition departed from Chile on the research ship *Melville* and will travel almost due west, ending at Rapa Nui (Easter Island). Check out the tracking website with journal entries, a media gallery, and more.
http://cmore.soest.hawaii.edu/cruises/big_rapa/index.htm

Bigelow Lab Resources
The scientists at the Bigelow Laboratory for Ocean Sciences share their discoveries with educators, students, and the public through a variety of programs. Their website offers on-line education resources available for teachers to use in a range of grade levels, in addition to other resources and networks for further information.
http://www.bigelow.org/education/

Bilko
Supported by UNESCO, Bilko is a system for learning and teaching remote sensing image analysis skills. Current lessons teach the application of remote sensing to oceanography and coastal management, but Bilko routines may be applied to the analysis of any image in an appropriate format, and include a wide range of standard

image processing functions. Bilko is available to registered users for free. The website offers PC-based software, tutorials, thematic modules, and more.
http://www.noc.soton.ac.uk/bilko/

Billfish Film Documentary
As part of programming around Earth Day in April, a new documentary, *Billfish: A Challenge for Survival,* is being aired and distributed by the Public Broadcasting Service. Copies of the show, on either VHS or DVD, will be available through each PBS station at the conclusion of the broadcast. In the U.S., viewers can call 1-800-533-8321 to purchase a copy. International distribution to foreign television markets will proceed after six months of U.S. telecasts.
http://www.billfishdocumentary.com

Bilingual Publication for Recreational Users of Coral Reefs
The Coral Reef: Precautions for Recreational Users in Puerto Rico and the U.S. Virgin Islands
El Arrecife de Coral: Precauciones para los Usuarios Recreativos en Puerto Rico y las Islas Vírgenes Estadounidenses
NOAA's National Marine Fisheries Service has produced this recreational users guide that explains what coral reefs are and measures that can be taken to protect them. The guide is distributed through the NMFS Habitat Conservation Division Caribbean Field Office in Puerto Rico.
Contact Dr. Lisamarie Carrubba at 787-851-3700 or lisamarie.carubba@noaa.gov

BioBlitz - California
BioBlitz is a 24-hour event in which teams of scientists, volunteers, and community members join forces to find, identify, and learn about as many local plant and animal species as possible. A BioBlitz will take place in the Santa Monica Mountains National Recreational Area, May 31-32, 2008. Educators are encouraged to have their students participate. National Geographic and the U.S. National Park Service are planning a series of ten annual BioBlitzes around the country – check the website for future sites.
http://www.nationalgeographic.com/field/projects/bioblitz.html

BioBlitz - Indiana
BioBlitz is a 24-hour event in which teams of scientists, volunteers, and community members join forces to find, identify, and learn about as many local plant and animal species as possible. A BioBlitz will take place at Indiana Dunes National Lakeshore on May 15-16, 2009. Educators are encouraged to have their students participate, and educational materials are available for download from the website.
http://www.nationalgeographic.com/field/projects/bioblitz.html

BioBlitz – Rhode Island
Sponsored by the Lincoln Land Trust and the Blackstone River Watershed Council, BioBlitz 2006 will be held June 9-10, 2006 in Cumberland, Rhode Island. The BioBlitz will involve scientists and volunteer naturalists who will tally as many species as possible in a 24-hour period to increase awareness of the variety of life on even the most mundane-looking land.
http://www.uri.edu/ce/rinhs/bioblitz.htm

Biocubes
Students examine one cubic foot of space and discover and report all the living things that are found within it. They can compare the animal, plant, and fungus community of their biocube with those of other biocubes from other places.
http://qrius.si.edu/biocube

Biocultural Heritage Website
The International Institute for Environment and Development and partners have launched this website with its focus on biocultural heritage. Biocultural heritage includes a wealth of biological resources, from genetic to landscape level, and long standing traditions and practices for their sustainable use and adaptive management. It also describes the bundle of rights that support indigenous peoples and local communities.
http://biocultural.iied.org/

Biodidac
Biodidac is a bank of digital images, video, and animations that can be used and adapted for teaching biology. They have black and white illustrations that are free for educators; registration is required. Illustrations are included from Eubacteria, Protista, Fungi, Plantae, Animalia, Human Biology, and Histology. The website is available in French and English.
http://biodidac.bio.uottawa.ca/

Biodiversity and Agriculture
The Convention on Biological Diversity supports teachers in guiding students through an exploration of biodiversity issues with the launch of its first educational module for children and teachers on biodiversity and agriculture. The module consists of an online educational web portal for primary school students, and five accompanying lesson plans for educators. The module has been designed to engage students in a variety of exercises reflecting the principles of education for sustainable development.
https://www.cbd.int/ibd/2008/resources/teaching/

Biodiversity and Conservation
This book is by Peter J. Bryant of the School of Biological Sciences, University of California, Irvine. The book covers the origin, nature and value of biological diversity, threats to its continued existence, and approaches to preserving what is left. The book itself is on-line, and most of the links leave the book in order to take advantage of documents produced and updated elsewhere. Ocean resources are covered, with chapters on whaling and fishing, endangered aquatic habitats, and islands.
http://darwin.bio.uci.edu/~sustain/bio65/Titlpage.htm

Biodiversity Counts
The *Biodiversity Counts* website offers a resource collection for middle school students, which takes students into the field and engages them in life science research - the inventory of plants and arthropods outside their own backdoors. Materials include lesson plans, profiles of scientists and museum staff, essays, and interactives that help students explore, analyze, and apply their field observations.
http://www.amnh.org/education/resources/biocounts/
http://www.amnh.org/nationalcenter/it_takes_all_kinds/

Biodiversity Education Network
The Biodiversity Education Network is a coalition of organizations dedicated to enhancing local, regional, and national efforts to educate people of all ages about biodiversity. It was created to promote networking among those organizations and individuals who are working in biodiversity education. The website provides a searchable database of biodiversity materials, a calendar of events, and an outline for developing an education program along with links to additional resources.
http://www.bioednet.org/

Biodiversity Facts And Figures
The Science and Development Network Biodiversity pages have an updated Biodiversity Facts and Figures Section. Here, you will find the latest data on the extent and the distribution of the world's biodiversity. It also includes the most recent estimates of extinction threats for different groups of species, as well as facts and figures on the value of biodiversity and efforts to conserve it.
http://www.scidev.net/ms/biofacts/

Biodiversity Heritage Library
The Biodiversity Heritage Library is a consortium of natural history and botanical libraries that cooperate to digitize and make accessible the literature of biodiversity held in their collections. Check out the tag cloud for topics, including fisheries, oceanography, and much more.
https://archive.org/details/biodiversity

Biodiversity Heritage Library
Ten major natural history museum libraries, botanical libraries, and research institutions have joined to form the Biodiversity Heritage Library Project. The group is developing a strategy to digitize the published literature of biodiversity held in their respective collections and make it available through a global "biodiversity commons." The participating libraries have over two million volumes of biodiversity literature collected over 200 years; over 1.124 million pages of key taxonomic literature are already on-line.
http://www.biodiversitylibrary.org/

Biodiversity Indicators Partnership
The 2010 Biodiversity Indicators Partnership is a global initiative funded by the Global Environmental Facility, which brings together international organizations to develop biodiversity indicators and assess biodiversity loss. The website offers a portal to provide comprehensive information on global biodiversity indicators and trends.
http://www.twentyten.net/

Biodiversity Information Center
The Convention on Biological Diversity offers this website to facilitate access to and exchange of information on biodiversity related publications, bibliographies, and other resources. There are currently over 3000 monographs, reports, and serials available from the website. In addition, there are links to a variety of glossaries, case studies, and information on biosafety.
http://www.biodiv.org/doc/info-centre.shtml

Biodiversity Information Serving Our Nation (BISON)
Discover the locations where plant and animal species have been documented. Access this database to support scientific, educational, and policy-making activities regarding

species occurrence and distribution. Users can query species by name, range, state, county, or data record provider. BISON displays search results in list or interactive map formats
http://toolkit.climate.gov/tool/biodiversity-information-serving-our-nation-bison

Biodiversity and the Law: Intellectual Property, Biotechnology and Traditional Knowledge
This book offers twenty-eight chapters from dozens of international legal and scientific experts, complete with thorough references. It examines biodiversity, what are we losing, why, and looks at what is to be done; addresses biotechnology; examines traditional knowledge; and looks at ethnobotany and bioprospecting and offers practical lessons from the diverse experiences of the contributors.
http://styluspub.com/books/BookDetail.aspx?productID=151824

Biodiversity Finance Book
The downloadable publication, The Little Biodiversity Finance Book, highlights many ways for policy makers to generate funding to support biodiversity and ecosystem services. The authors advise readers to embrace Proactive Investment in Natural Capital, or "Think PINC." Along with background on biodiversity, the book offers options for generating financing, delivering the financing to the people who need it, and governing the financing via institutional arrangements.
http://globalcanopy.org/themedia/file/PDFs/LBFB_lowres/lbfb_en.pdf

Biodiversity Guide for Developing Countries
SciDev.Net is an organization devoted to providing news and promoting debate on science and technology issues relevant to the needs of developing countries. The online guide to the biodiversity challenges facing developing countries looks at the issues surrounding the need to protect global biodiversity in developing countries and the need to promote social and economic growth.
www.scidev.net/biodiversity

Biodiversity on the Move
Atlantic Public Media and Eduardo Garcia Milagros offer *One Species at a Time: Stories of Biodiversity on the Move, with the Encyclopedia of Life*, in Google Earth narrated tours. Current podcasts highlight Arctic Terns, invasive Sea Grapes, Bluefin Tuna, and more.
http://eol.org/collections/14013

Biodiversity Research and Teaching Collections
The Texas A&M Biodiversity Research and Teaching Collections is one of several natural history collections within the Texas A&M system. The collections include fishes, amphibians, reptiles, birds, mammals, parasites, and marine invertebrates. Specimen data can be located through a search engine.
http://brtc.tamu.edu/

Biodiversity in a Rapidly Changing World
The National Council for Science and the Environment offers this website featuring efforts to advance science and public understanding of the loss of biodiversity and life on Earth.
http://www.NCSEonline.org/biodiversity

BioEd Online
The Baylor University College of Medicine offers the BioEd Online website for educators, students, and parents. The website includes streaming video presentations, a slide library, science news updates from the journal *Nature*, and virtual workshops. Check out the Ready-to-Go Lesson, The Water Cycle and Global Warming; presentations on the diversity of life; the K-5 Resource, Create a Lasting Water Cycle; and more.
http://www.bioedonline.org/

Bioimages
The Bioimages database has been developed by the Department of Biological Sciences at Vanderbilt University in cooperation with other participating institutions and agencies. The image databases cover a wide range of biogeographical regions and their associated flora.
http://www.cas.vanderbilt.edu/bioimages/

BioInteractive
The Howard Hughes Medical Institute Cool Science portal has been retired; materials are now linked from this website, including interactive teaching tools, teacher's guides, animations, and more. Topics include biodiversity, environmental science, careers, and much more. Materials include Earthview, lecture series, an AP Biology Guide, the HHMI bulletin and archives, and more.
http://www.hhmi.org/educational-materials

BioLEARN
BioLEARN (Linking Educators As a Resource Network) is an on-line collection of biology education materials created for and by Wisconsin high school and middle school biology teachers, coordinated by the Center for Biology Education at UW-Madison. The website includes teaching activities and resources aligned with Wisconsin Model Academic Standards and incorporating standards-based student performance measures. Sample activities are included in ecology, classification, botany, and more.
http://www.wisc.edu/cbe/biolearn/index.html

Biological ESTEEM
The Biological ESTEEM (Excel Simulations and Tools for Exploratory, Experiential Mathematics) Collection is a project of the BioQUEST Curriculum Consortium. The project offers sample applications of mathematics across the spectrum of activity-based general biology curricula. Particular attention is paid to equations that have significantly transformed contemporary biological practice and that are widely used in classroom, laboratory, and field activities through use of simulations, tools, and databases.
http://mathdl.maa.org/mathDL/3/?pa=content&sa=viewDocument&nodeId=623

Biologist in Training
This program from the U.S. Fish & Wildlife Service is designed to guide students through a hands-on exploration of aquatic habitats. The BiT Activity Booklet has been designed with the needs of upper elementary science teachers in mind. Activities offer different means of collecting, organizing, and analyzing biological information, and focus on the students' use of observation skills to make their own discoveries. Additional resources include an activity card for younger students, extension activities, and more.
http://www.fws.gov/southeast/fisheries/BiT/

Biology Corner
This virtual biology website is maintained and updated by science educator and high school teacher, Shannan Muskopf. The website offers labs, worksheets, and various classroom activities. Lesson plans include Biodiversity of Ponds, Comparing Ecosystems, and more. There are online quizzes and links to other science education resource websites.
http://www.biologycorner.com/

BiologyBrowser
Biology Browser is a free website offering resources for the life sciences information community. You can browse by organism, subject, and geography. The Guide to the Animal Kingdom offers a simplified (and somewhat abbreviated) classification scheme for the whole animal kingdom. A searchable database offers links to information and resources for educators and students.
http://www.biologybrowser.org/

Biology Classroom Resources
The National Science Digital Library offers links to lessons and resources about biology from one convenient location. Learn about cells, slugs, whales and dolphins, turtles, biodiversity, and more. Find online references, images, and interactive games on evolution and the animal kingdom.
http://www.nsf.gov/news/classroom/biology.jsp

Bioluminescence 2009: Living Light on the Deep Sea Floor Expedition
NOAA's Ocean Exploration and Research Program has launched the *Bioluminescence 2009: Living Light on the Deep Sea Floor Expedition* webpage, following a July 20-30, 2009 expedition. The educators working with scientists from the expedition have developed an Ocean Explorer Expedition Education Module for the mission designed for teachers of students in grades 5-12. Be sure to check out ORCA's Eye-in-the-Sea and other visual media.
http://oceanexplorer.noaa.gov/explorations/09bioluminescence/welcome.html

Bioluminescence and Vision on the Deep Seafloor 2015
NOAA's Office of Ocean Exploration and Research offers the Bioluminescence and Vision on the Deep Seafloor 2015 Expedition web page following the expedition of the R/V Pelican from July 14-27, 2015. The website includes mission logs, multimedia, an Ocean Explorer Expedition Education Module, and much more.
http://oceanexplorer.noaa.gov/explorations/15biolum/welcome.html

Bioluminescent Web Page
This website from the University of California – Santa Barbara includes information on bioluminescence research, photos, chemistry, and much more. Start here for all your bioluminescence journeys.
http://www.lifesci.ucsb.edu/~biolum/

BIOMapper
NOAA's National Centers for Coastal and Ocean Science offers the St. John Biogeography Integrated Online Mapper. BIOMapper lets users interactively view data, aerial imagery, dive photography, underwater video, and related publications for the benthic habitat mapping. The tool is an easy way to view the benthic habitat data,

examine the attributes of the data, and show different thematic representations of the data. PDF maps can be produced of user-selected areas in a pre-formatted template.
http://ccma.nos.noaa.gov/gv_stjohn/StJohn.html

BioMEDIA Associates
BioMEDIA ASSOCIATES produces multimedia programming for life science instruction for middle school, high school, and college students that captures the diversity of the living world. The website offers a large amount of overview information and vibrant illustrations, including a series of free posters.
http://www.ebiomedia.com/

Biomes and Ecosystems
The National Earth Science Teachers Association's Windows to the Universe biomes and ecosystems, offers an interactive map to explore various biomes and learn about the natural history and current conditions in the dry steppes, alpine tundra, and other biomes. Each section contains photographs and a narrative essay that describes key features of each biome.
http://www.windows2universe.org/earth/ecosystems.html

Biomes of the World
This website from the Missouri Botanical Garden offers an introduction to the biomes of the world, including land, freshwater, and marine ecosystems. It offers insight into wetlands, shorelines, temperate and tropical oceans. One example is the barrier islands website with a simple diagram and basic introductory information. Good links to additional websites allow you to delve deeper into subjects of interest.
http://mbgnet.mobot.org/

Biomimicry Education Network
The Biomimicry Education Network (BEN) is a global community of teachers who are integrating biomimicry into K-12 classrooms, university courses, and informal learning environments. The website and blog support members by providing curriculum and resource downloads, a platform to connect with colleagues, and news and information. Check out the on-line flip-book, Biomimicry in Youth Education. Note: free registration is required.
http://ben.biomimicry.net/

Biomimicry Institute Curricula
The goal of this curriculum is to introduce students to biomimicry, the science and art of emulating nature's biological ideas to solve human problems. Examples include carbon-sequestering cement inspired by corals and energy efficient wind turbines inspired by schooling fish. Teaching materials include curricula for elementary, middle, and high school students and links to additional resources.
http://www.biomimicryinstitute.org/education/k-12/curricula.html

bioRxiv (Bio-Archive)
This website from Cold Spring Harbor Laboratory serves as a preprint server for biology papers. Note that the papers posted here are not peer-reviewed. The website is searchable by subject area, date, author, keyword, and title. Topics include animal behavior, ecology, and much more.
http://biorxiv.org

BiosciEdNet
BiosciEdNet, the BEN Collaborative is composed of professional societies and coalitions for biology education. BEN Collaborative is the Biological Sciences Pathway for the National Science Digital Library (NSDL), a program of the National Science Foundation. The BEN portal provides searchable access to the digital library collections of its partners to provide users with accurate and reliable biology education resources. Subjects include marine biology, oceanography, and more.
http://www.biosciednet.org/portal/

Bioscience Lesson Directory
ActionBioscience.org provides original peer-edited lessons, written by science educators, to specifically accompany peer-reviewed articles on the ActionBioscience website. Each lesson contains questions related to the article, as well as a variety of student activities that promote active learning and inquiry into current issues in the biosciences. Topics include biodiversity, alien species, ecosystem value, water issues, and more.
http://www.actionbioscience.org/lessondirectory.html

Bioscience Literacy
This educational resource of the American Institute of Biological Sciences is designed to promote bioscience literacy. It highlights articles in English and Spanish by scientists, science educators and science students on issues related to seven bioscience challenges, including the environment, biodiversity, and bioscience education. In addition, the website provides lessons and resources to enhance bioscience teaching.
http://www.actionbioscience.org/

Birch Aquarium at Scripps – Teacher Open House
The Birch Aquarium at Scripps Institution of Oceanography is hosting a free Teacher Appreciation and Open House, October 14, 2008 in La Jolla, California.
http://aquarium.ucsd.edu/Education/For_Schools/For_Teachers/Professional_Development/Appreciation_and_Open_House_Events/

Bird Cams
All of the bird cams from the Cornell Lab of Ornithology have been consolidated onto one website. The home page offers news updates, highlight videos, and more.
http://cams.allaboutbirds.org/

Bird Education Alliance for Conservation
The Bird Education Alliance for Conservation is a coalition of educators representing universities, bird observatories, local, state, and federal agencies, and environmental education and conservation groups. They are working to promote bird conservation education and to develop effective ways to implement bird conservation through education.
http://www.birdedalliance.org/

Bird Migration
AMSER (Applied Math and Science Education Repository) offers this website with links to various aspects of bird migration.
http://amser.org/amser/topicindepthbirdmigration

Bird & Moon
Rosemary Mosco is a field naturalist, artist, and nature lover with a passion for science communication. Check out this website with charts and comics. Spend some time laughing here.
http://www.birdandmoon.com/index.html

Bird Song Hero
The All About Bird Biology team from Cornell has developed the game, Bird Song Hero, asking players to match the song they're hearing to one of three visual representations of the sound. The game puts the visual side of the brain to work.
http://biology.allaboutbirds.org/bird-song-hero/

BirdNote
BirdNote seeks to inspire listeners to care about the natural world and take steps to protect it by telling vivid, sound-rich stories about birds and the challenges they face. While the stories are aired on public radio stations, the archives are available for listening to, or reading, online.
http://birdnote.org/

BirdSleuth
Bring science to life through inquiry with BirdSleuth's resources. Through citizen science, students observe the world, ask questions about the environment, and investigate natural relationships. The website offers kits, downloads, and more.
http://www.birds.cornell.edu/birdsleuth/

Birdcinema.com
Birdcinema.com is a website for people to post bird videos, dedicated to the sharing of birding videos, pictures, and resources. They seek both amateurs and professionals willing to share their bird videos and a little about the bird, the video, or whatever else they feel is relevant. The channels section allows for grouping of videos such as inland water birds, education, and more. Education offers background and other information.
http://www.birdcinema.com/

BirdLife International Database
You can find full accounts of all globally threatened birds on this web database. The accounts include a distribution map and an illustration of each bird. There is a concise account and extended report which gives all of the data held in the BirdLife World Bird Database.
http://www.birdlife.org/datazone/search/species_search.html .

BirdNote
BirdNote is a radio series about the intriguing ways of birds. Each show is scheduled to coincide with the time of year when you can see or hear the featured bird, to help you be able to exclaim, "Oh, that's what that is!" BirdNote shows are two-minute vignettes that incorporate sounds of birds with stories that illustrate their interesting or intriguing abilities. The radio shows are archived on the website for downloading. Links are also provided to BirdWeb for more information.
http://www.birdnote.org/kplu-archive.cfm

Birds Without Borders
Birds Without Borders - Aves Sin Fronteras® Landowner Recommendations manual, is the result of a research, education, and conservation project that has been studying birds in both Wisconsin and Belize since 1997. It provides information on habitats and plants found to be important to birds, along with many pictures of birds and plants so that the reader can easily identify them. The manual aims to conserve Belize's birds, both resident and Neotropical migratory birds that link Belize and Wisconsin.
http://www.zoosociety.org/Conservation/BWB-ASF/BelizeLandowner.php

BirdsEye and BirdLog
These apps from Birds in the Hand are available for both iPhones and Android phones. BirdsEye guides you to the birds using the millions of sightings entered every month into eBird.org, while BirdLog finds your location, times your outing, and keeps a running tally of the birds you see, allowing you to enter them into your eBird account.
http://birdseyebirding.com/

BirdSleuth K-12
The BirdSleuth project helps birds teach students about science. Downloadable lesson plans are available for drawing upon the Birds-of-Paradise Project website and videos, for homeschoolers, and more. Be sure to check out the workshops and webinars.
http://www.birdsleuth.org

Biscayne National Park BioBlitz
Biscayne National Park and National Geographic are teaming up for the 2010 BioBlitz, April 30-May 1, 2010 in Homestead, Florida. This event will connect students and the community with scientists in order to count species of every shape, color, and size in Biscayne National Park. The event promotes science education, provides students with access to scientists, and celebrates biodiversity. Make sure to attend the Celebrate Biodiversity Festival immediately following the blitz.
http://www.nps.gov/bisc/supportyourpark/bioblitz.htm

Black Sea Shipwreck Expeditions
Dr. Ballard and his team return to the Black Sea from August 18-24, 2007, to document two Byzantine-era shipwrecks. Explore alongside the scientists with live updates from the expedition. Ask questions of the scientists before the broadcasts; they may be answered live at Thunder Bay National Marine Sanctuary's Great Lakes Maritime Heritage Center in Alpena, Michigan.
http://www.immersionpresents.org

Black Smokers WebQuest
This website from the University of Sydney's UniServe Science contains a webquest where student groups investigate one aspect of the science of black smokers. The webquest provides a separate list of links for each research role, including geochemist, biologist, oceanographer, and geologist. The website offers links to current information, animations, and more.
http://science.uniserve.edu.au/school/quests/hydroventwq.html

The Blu
The Blu is a new geosocial web application where people connect across the Internet and explore the ocean on the web.
http://theblu.com/

Blue Ocean Film Festival Finalists
The BLUE Ocean film competition finalists have been selected. Check out the trailers in categories such as animation, cinematography, conservation innovation and solutions, and much more. All finalists will be screened during the Blue Ocean Film Festival, November 3-9, 2014 in Saint Petersburg, Florida.
http://www.blueoceanfilmfestival.org/2014_film_finalist_3.htm

Blue Planet: Introduction to Oceanography
In this course, Professor Edwin Schauble offers 27 free video lectures on Introduction to Oceanography. The class provides a general introduction to geological, physical, chemical, and biological processes and history of Earth's global oceanic system.
http://www.cosmolearning.com/courses/blue-planet-introduction-to-oceanography-290/

Blue Planet Run
The book *Blue Planet Run* provides readers with a look at the water problems facing humanity and some of the solutions being pursued by large and small companies, by entrepreneurs and activists, and by nongovernmental organizations and foundations. The book may be purchased or downloaded (beware: large file, 122 pages) from this website. All royalties from the book will be used to provide clean water to people around the world.
http://www.amazon.com/Blue-Planet-Run-Provide-Drinking/dp/160109017X/ref=cm_taf_title_featured?ie=UTF8&tag=tellafriend-20

Blue Whales
National Geographic offers an interactive article on blue whales, derived from a March, 2009 feature in the print edition of National Geographic magazine. The website offers an in-depth look into the recovery of the blue whale population off the coast of Costa Rica in recent years, a quiz on these creatures, and an online video.
http://ngm.nationalgeographic.com/2009/03/blue-whales/brower-text

Blue World
Segments to the Blue World underwater adventure television series can now be viewed online. Each 8-10 minute segment also has a downloadable teacher's guide.
http://www.blueworldtv.com/

Boating Materials
NOAA's Office of Coast Survey offers a one-stop-shop website with materials for boaters to increase their boating safety and enjoyment. Downloadable materials include BookletCharts, educational activities, the Coast Pilot, and more.
http://noaacoastsurvey.wordpress.com/2013/07/19/free-noaa-nautical-products-for-boaters/

Bob the Drifter
The Consortium for Advanced Research on Transport of Hydrocarbon in the Environment is a research team dedicated to predicting the fate of oil released into the environment to help inform and guide response teams. They teamed up to produce this short YouTube video about Bob the Drifter. Follow along with Bob as he moves throughout the Gulf of Mexico, providing information to the scientists so they can predict where the currents may take the spilled pollutants, larvae, and more.
http://www.youtube.com/watch?v=gysyr2lqwFs

Bobs & LoLo
Bobs and LoLo are dedicated to connecting kids to the natural world with music, movement, and make-believe. Sharing musical stories that engage, inspire, and educate, they teach kids to care about themselves, their neighbors, and the planet. Listen to Sea Notes and check out the rest of the website.
http://www.bobsandlolo.com/music.html

Bonaire 2008: Exploring Coral Reef Sustainability with New Technologies Expedition
NOAA Ocean Exploration has launched the *Bonaire 2008: Exploring Coral Reef Sustainability with New Technologies Expedition* web page. The expedition, January 7-30, 2008, presented an opportunity to follow the journey to one of the few coral reefs that seems to have escaped the recent coral reef crisis. The website offers expedition and background information, lesson plans, career connections, multimedia resources, and more.
http://oceanexplorer.noaa.gov/explorations/08bonaire/welcome.html

Bonneville Power Administration's Resources for Teachers
The Bonneville Power Administration offers lessons on energy conservation, water and electricity, stream environments and stream health, aquatic macroinvertebrates, and the life cycle of salmon. High school students can conduct an energy audit of their school. The website must have undergone a recent update – note that some of the links aren't working, but a Google™ search finds the materials.
http://www.bpa.gov/Corporate/KR/ed/page6.htm

Book of Insect Records
The University of Florida hosts the Book of Insect Records website which names insect champions and documents their achievements. Check out Most Tolerant of Cold, Shortest Generation Time, and Smallest Eggs. Individual chapters can be downloaded for easy access and each record offers scientific, referenced detail. The topics can be used to pique students' imagination while encouraging them to further research their greatest interests.
http://entnemdept.ifas.ufl.edu/walker/ufbir/index.shtml

BookletChart
NOAA's Office of Coast Survey is testing a potential new product named the BookletChart™. This product will enable recreational boaters to print charts at home for no charge. It has been created to help recreational boaters better navigate and practice safer transportation on the water. The BookletChart™ is a form of nautical chart that has been reduced in scale and divided into a series of pages for convenience, but retains all the information of the full-scale nautical chart.
http://www.nauticalcharts.gov/bookletcharts/

BookletCharts for Boaters
NOAA's Office of Coast Survey introduces BookletCharts, moving the product into official production. These reduced-scale nautical charts in PDF format for in-home printing are available for downloading and printing for free.
http://www.nauticalcharts.noaa.gov/staff/BookletChart.html

Border-Wide EE Coalition
The Border-Wide EE Coalition Web site is a rich source of environmental education information for the US-Mexico border region. The portal provides a calendar and live search feature on every page, lists bilingual publications, hundreds of organizations, contacts, events, and more.
http://redeafronteriza.net/ (Spanish)
http://bordereeweb.net/ (English)

Boston Harbor Islands Curriculum
The Boston Harbor Islands, part of the National Park System, include 34 islands that lie within Boston Harbor. The national park area extends seaward 11 miles from downtown Boston. The landmass of the Boston Harbor Islands is between 1,600 - 3,100 acres, depending on the tides. In addition to maps and visitor information, the website includes downloadable curriculum for teachers and on-line quizzes for students.
http://www.bostonislands.org/learn/index.html .

Boston Sea Rovers Clinic
The Boston Sea Rovers Clinic, March 8-9, 2014, March 6-8, 2015 in Danvers, Massachusetts, is dedicated to education, conservation, and exploration of the underwater world. The show features seminars, a Saturday Evening Film Festival, free Sunday programs for kids, and more. Daytime student volunteer opportunities for the clinic are available.
http://www.bostonsearovers.com/

Box Office at Sea Level from Space
NASA's Jet Propulsion Laboratory's Sea Level from Space website offers two short videos, *Earth: the Water Planet* and *Frozen Earth*.
http://sealevel.jpl.nasa.gov/newsroom/featurearchive/index.cfm?FuseAction=ShowNews&NewsID=369

Boy Scout Oceanography Merit Badge
Boy Scouts of America can earn a merit badge in Oceanography. The curriculum of the course is a combination of content and hands-on activities. Scouts in the Delaware area can contact Chris Petrone at petrone@udel.edu.
http://www.udel.edu/udaily/2014/jul/scouts-oceanography-070813.html
http://www.scouting.org/scoutsource/boyscouts/advancementandawards/meritbadges/mb-OCEN.aspx
http://usscouts.org/mb/worksheets/Oceanography.pdf

Brain-Powered Science
Brain-Powered Science is a resource for middle and high school teachers looking to stimulate students' thinking. The book offers thirty-three hands-on activities based on the science of a discrepant event—an experiment or demonstration in which the outcome is not what students expect—and can motivate students to reconsider preconceived notions and think about what has actually occurred.
http://www.nsta.org/store/product_detail.aspx?id=10.2505/9781935155102&lid=exp

Breaking Waves
The World Ocean Observatory offers Breaking Waves, an online ocean news service. Features and articles on ocean and water-related issues are chronologically compiled from daily searches of more than 150 news and information sources around the globe.

Don't forget to check out the World Ocean Observatory's education offerings under Ocean Classroom and the information about maritime history and culture under Cultural Ocean.
http://www.thew2o.net/oceanForum.html

Bridge Activities and Ocean Science Podcasts
COSEE-NOW partners offer Volume I of Ocean Gazing pairing the Ocean Gazing podcasts with related classroom-ready data activities. Students will learn about ocean science research straight from the scientists and explore actual ocean science data. The free CDs, as well as the individual podcasts and activities, are available on the COSEE-NOW website, where educators can also participate in discussions and collaborate on ocean-observing system-related education projects.
http://coseenow.net/
http://www.marine-ed.org/bridge/

Bridge at NSTA
Visit the Bridge exhibit at the NMEA Whale of a Share-a-thon at the NSTA National Conference and the NESTA Share-a-thon. There will be lots of great resources for the taking. Then, , the Bridge's Chris Petrone will be demonstrating the Data Analysis Teaching Activity Can't Take the Heat? during the first session of the day-long COSEE Program. In addition, the Bridge's Chris Petrone demonstrated the Data Analysis Teaching Activity *Satellites and Storms* during the second session of the day-long COSEE Program.

http://www.marine-ed.org/bridge

Bridge Data Analysis Teaching Activities
Data Analysis Teaching Activities (DATAs) utilize online scientific data from research projects all over the country, presented in an organized, controlled format, which allows for easier analysis and comprehension. By working with real data, students better understand basic scientific concepts and learn about the issues most prevalent in today's lakes, rivers, and oceans. Currently, the DATA series contains over 65 activities in biology, human activities, ecology, physics, chemistry, climate, and geology.
http://www.marine-ed.org/bridge/index_archives.html

The Bridge Facebook Page
The Bridge Facebook page identifies when and where the next Bridge presentations will be, introduces new sites as they are added to the Bridge, posts pictures from sessions and exhibits, and holds discussions concerning resources you all would like to see added to the Bridge and which Data Analysis Teaching Activities (DATAs) you all like the best and how you have modified them.
http://www.facebook.com/pages/Gloucester-Point-VA/The-Bridge/34259244804?ref=s
http://www.marine-ed.org/bridge

The Bridge to Highlight NOAA Education Resources
During 2006-2007, the Bridge will work to bring NOAA education products to the forefront by highlighting them as a special collection of reviewed websites for educators. This collection will be featured on a special gateway page which will include annotated links to NOAA education resources that have been evaluated through the Bridge's Teacher Reviewer of On-Line Learning (TROLL) program.
http://www.marine-ed.org/bridge

The Bridge Needs You
In an effort to better assist educators with teaching climate change science and its impacts, the Bridge needs your help to increase the number of climate change resources within its collection. If you have online climate change resources that you have developed or use with your students, please nominate it today. Each resource undergoes a review process completed by Teacher Reviewers of On-Line Learning. The TROLLs evaluate the resource's educational and content value, and usability.
Bridge site nomination form - http://www2.vims.edu/bridge/search/nominate.cfm

The Bridge at NSTA
The Bridge joined the National Science Teachers Association annual conference, March 29-April 1, 2012 in Indianapolis, Indiana. The Bridge will be on display at the National Marine Educators Association (NMEA)'s Whale of a Tale Share-a-thon on Thursday, March 29 from 8:00–9:00 AM in the Westin Indianapolis Grand Ballroom 5. Join them also on Saturday for a demonstration of the data-based lesson plan "Sea Level Trends" as part of the Centers for Ocean Sciences Education Excellence (COSEE) track.
http://www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive0910.html
http://www.nsta.org/conferences/2012ind/

The Bridge SMILEs
Many of the Bridge Data Analysis Teaching Activities (DATAs) can now be found on the new SMILE online resource center. SMILE is the Science and Math Informal Learning Educators pathway of the National Science Digital Library (NSDL), and their website is dedicated to bringing science, technology, engineering, and math activities and resources to informal educators. As a project partner, the Bridge's DATA series are being accessioned into the SMILE collection.
http://www.marine-ed.org/bridge/
http://www.howtosmile.org

Bridge Webinars
The Bridge has just completed its first two webinars. The first introduced participants to the Bridge website and all of its many features; the second webinar served as an introduction to ocean observing systems, their uses and components, as well as how educators can use the systems with their students. Both webinars are archived on the Bridge and COSEE-NOW websites, and forums have been set up on the COSEE-NOW site for those that want to discuss the webinars.
Bridge - http://coseenow.net/2009/05/bridge-online-webinars/
COSEE-NOW – http://coseenow.net/2009/05/bridge-online-webinars/

Bridge e-Updates
The Bridge now offers monthly e-Updates, bringing you new marine education resources and happenings to encourage you to plunge into ocean science education. These brief, monthly updates, distributed through the Scuttlebutt e-mail list, will help to keep you current on ocean science education. Subscribe to Scuttlebutt, the email list for ocean educators to receive this useful resource.
http://www2.vims.edu/bridge/search/scuttle.cfm

Bridge's NOAA Collection
The Bridge now offers a special NOAA collection with more than 145 resources which have been reviewed by our Teacher Reviewers of On-Line Learning (TROLLs). The

collection includes a roll-over navigation menu and a search engine. The navigation menu is arranged by topic, including all science disciplines, habitat, virtual expeditions, and more. Each resource in the collection features the link to the resource, a brief description, the grade levels for which the resource is appropriate, and a related image.
http://www2.vims.edu/bridge/noaa/

Bridge's Tsunami Blog
The Bridge has created a special blog through which you may share information as well as learn of ways you may help. Check back often, as new resources will be posted.
http://bridge.blogs.wm.edu/tsunami-in-japan/

briefCAISE
The premier issue of briefCAISE, the newsletter of the Center for Advancement of Informal Science Education (CAISE), offers news, educational links, information about opportunities, and more. CAISE is devoted to advancing and improving the practice of informal science education, including film and broadcast media, science centers and museums, zoos and aquariums, botanical gardens and nature centers, digital media and gaming, and youth, community, and after-school programs.
http://insci.org/resources/

Bright Future Environmental Card Game
This website from Applied Materials offers a free card game that educates about science issues. Players can learn how science can make the Earth a better place to live, while having fun. The website offers the downloadable cards, an activity guide, and more.
http://brightfuture.appliedmaterials.com/game/

Bringing Coastal Issues to the Public Eye
Here are a couple of initiatives that bring ocean and coastal issues closer to the broader public eye:

- Ohio License Plate: Ohio drivers can purchase a new *Fish Lake Erie* license plate. A portion of its sale will support research and education programs of Ohio Sea Grant and Stone Lab. http://bmv.ohio.gov/vehicle_registration/fish_lake_erie.htm
- National Marine Sanctuary Foundation is now included in the upcoming Combined Federal Campaign, number 9255.
- The July 9 issue of the Sunday comic, *Mark Trail*, focused on the threats to coral reef ecosystems. http://coralreefwatch.noaa.gov/marktrail/index.html

Bringing Wetlands to Market
This website offers a downloadable high school STEM curriculum related to the "Bringing Wetlands to Market" research project. The research studies, located in Falmouth and Mashpee on Cape Cod, Massachusetts, examine the relationship between salt marshes, climate change, nitrogen pollution, and the economic value of salt marshes as carbon sinks.
http://wbnerrwetlandscarbon.net/teachers/

British Ecological Society Teaching Resources
This website from the British Ecological Society offers a variety of teaching resources, including downloadable wall charts, lessons, links to virtual field trips, and more. Check out the Pond Resources, including Using Keys, a Beginner's Guide to Pond Dipping, and more. Fieldwork offers the downloadable A Guide to Fieldwork for Youth Expeditions,

Top Tips for schools to engage with biodiversity, Virtual Tours to Rocky Shores and Sand Dunes, and more.
http://www.britishecologicalsociety.org/educational/index.php

The Broad Benefits of Restoring the Great Lakes
The Great Lakes account for 90 percent of the United States' and 20 percent of the world's surface fresh water and represent an enormous economic and cultural resource to the region. The Brookings Institution offers this paper addressing the benefits of restoring the Great Lakes ecosystem from numerous threats, summarizing the major findings of a more in-depth study, *Developing America's North Coast: A Benefit Cost Analysis of a Great Lakes Infrastructure Program*.
http://www3.brookings.edu/metro/pubs/20070904_gleiecosystem.pdf

Broadcasts from Monterey Bay
Dr. Robert Ballard's Immersion Presents will broadcast live from the Monterey Bay National Marine Sanctuary in California from March 2-7, 2008. Live video feeds and educational materials will be available on the OceansLive.org web portal as the expedition team explores many of Monterey Bay's ecosystems, including estuaries, kelp forests, and deep submarine canyons.
http://www.oceanslive.org/portal/

Broader Impact Tools
COSEE NOW has created the Broader Impact Wizard to help users develop a broader impact statement that will satisfy NSF Criterion II and help communicate their science. The five-step process will produce an outline of important points to include in the statement and will help frame discussions with partners. In addition, there are pre- and post-award resources with grant applications.
http://coseenow.net/scientist-resources/

Bugscope and Virtual Microscope
The Bugscope project from the Beckman Institute's Imaging Technology Group at the University of Illinois provides free interactive access to a scanning electron microscope so that students anywhere in the world can explore the microscopic world of insects. The Virtual Microscope is a NASA-funded project that provides simulated scientific instrumentation for students and researchers worldwide, supporting functionality from electron, light, and scanning probe microscopes, and other related tools.
http://bugscope.beckman.illinois.edu/
http://virtual.itg.uiuc.edu/

Build a Squid
Nothing but fun! Build your own squid, set it free, and then check out what yours and all the other squids have been up to.
http://squid.tepapa.govt.nz/build-a-squid/interactive

Build Your Own ROV
NOAA scientist Doug Levin has developed a detailed manual to explain how to build a remotely operated vehicle (ROV) for underwater use. The manual lists parts and pieces, where to find them, and photographs of how to assemble them. The Monitor National Marine Sanctuary website publications page offers the downloadable manual, along with ROV lesson plans, origami and other activities, and much more.
http://monitor.noaa.gov/publications/

Building a Land Ethic
This website by the Aldo Leopold Foundation continues to foster Leopold's land ethic with posts about everything from student education to photo contests and more. Sign up for the newsletter, check out the teaching tools, and more.
http://www.aldoleopold.org/blog/building-a-land-ethic/

Building a Presence for Science
The mission of NSTA's *Building a Presence for Science* initiative is to end the isolation of classroom science teachers and to provide them with professional development opportunities and science teaching resources. The goals of the program are to identify a point of contact for standards-based science teaching and learning in every school; establish an electronic network of science educators, and create an infrastructure of partners who are advocates for effective science teaching and learning.
http://www.cabap.org/
http://ecommerce.nsta.org/bap/mission.asp .

Burning Issues
Burning Issues in Wildhorse Basin is an online interactive wildland fire education curriculum for grades 5-9 addressing fire and ecosystems in the west. This website deals with issues not specific to fire management along the coasts, but includes much pertinent information and easy-loading graphics to teach about the critical role fire plays in ecosystem management. The website includes activities, an educator's guide, vocabulary, and more.
http://www.blm.gov/education/whb/#In

Buy, Use, Toss
Buy, Use, Toss? A Closer Look at the Things We Buy, is an interdisciplinary curriculum unit from Facing the Future that leads students through an exploration of the system of producing and consuming goods. Students learn about the five major steps of the materials economy (Extraction, Production, Distribution, Consumption, and Disposal) and are asked to analyze the sustainability of these steps to determine how consumption can benefit people, economies, and environments.
http://www.facingthefuture.org/Curriculum/BuyUseToss/tabid/469/Default.aspx

BVI Marine Awareness Guide
The British Virgin Islands Ministry of Natural Resources and Labour and the Conservation and Fisheries Department are encouraging BVI residents to learn more about International Year of the Reef. They have launched a Marine Awareness Guide which includes information about the island's marine habitats, species, laws, and more. An on-line version is available for downloading from the SailDiveBVI website.
http://www.saildivebvi.com/paper/marine-awareness-08.pdf

C-Side
C-Side - Coastal Studies, Information and Data for the Ecosystem is a comprehensive Gulf Coast Storm Information Center, providing direct linkage to local, state and federal information as it pertains to severe weather preparation and monitoring across the Gulf of Mexico coastal region. Find recommendations for home preparation and evacuation as well as time-sensitive data, weather products, and storm surge information. Post-storm assessments on the ecosystem, response and recovery products, environmental

data and information, and remotely sensed data and imagery for affected areas will be available for response and recovery efforts.
http://ecowatch.ncddc.noaa.gov/c-side

Cachalot iTunes App
Dive in with Duke University's Cachalot app, a free digital textbook designed for students enrolled in Duke's Marine Megafauna class, but free for everyone, everywhere. This mobile app lets anyone using an iPad tablet device access a vast virtual library of videos, photos, maps, audio, and descriptive text about some of the sea's most charismatic creatures. A new species profile will be released every week.
http://itunes.apple.com/us/app/cachalot/id458866319?mt=8

Cal-Echoes Cruise
Cal-Echoes was a Scripps Institution of Oceanography student-led cruise, September 25–October 3, 2010 along the coast of southern California, that combined science at sea with science in the classroom. The website hosts an overview of the science, scientist and educator backgrounds, and lesson plans related to geology, physics, biology, and chemistry.
http://calechoes.ucsd.edu/

Calendar of Events from NSTA
The National Science Teachers Association (NSTA) hosts a searchable online calendar of events in the world of science and science education: events, awards and competitions, conferences, exhibits and films, and more. You can search according to your area of interest, by grade level, and by region of the United States or Canada.
http://www.nsta.org/main/calendar/events.php

2006 Calendars
Check out the following calendars for your holiday gift-giving, and support the education and outreach of these organizations. Don't forget to check out other favorite organizations for their holiday offerings.

- Mangrove Action Project: http://www.earthisland.org/map/calendar_2006.html
- Seas the Day: http://seastheday.theoceanproject.org/seastheday/order/
- National Marine Sanctuary Foundation: http://www.ideas4adv.com/nmsf/catalog.cfm
- Watchable Wildlife: http://secure.watchablewildlife.org/tek9.asp?pg=products&specific=jnqmqsd0

California Academy of Sciences
The California Academy of Sciences offers resources for the classroom, including lesson plans and activities, classroom kits to borrow, and more. The website has links to the free iTunes University Earthquake course; downloadable educator guides on topics including the Water Planet and California Coast; and more.
http://www.calacademy.org/teachers/

California Center for Ocean Science Excellence in Education (CA COSEE)
CA COSEE is dedicated to creating environments in which collaborations among ocean scientists and K-12 educators flourish, with the goal of enhancing the general public's understanding and appreciation of the ocean. The Center marshals the resources of UC San Diego's Scripps Institution of Oceanography, Marine Advanced Technology

Education (MATE) Center at the Monterey Penninsula College, the Marine Activities Resources and Education (MARE) Program at UC Berkeley's Lawrence Hall of Science, and California Sea Grant.
http://www.cacosee.net/index.html .

California Climate Change Extension
The California Climate Change Extension website offers scientific information about climate change in California. Interviews with leading climate change researchers are posted as 20-30 minute downloadable audio segments; they are also separated by topic into 2-3 minute short videos under Quick Topics. Transcripts of the interviews are also available for downloading. Additional links are provided to many resources for California climate change information.
http://groups.ucanr.org/CAClimateChangeExt/

California Climate Change Portal
This website combines information on the impacts of climate change on California and the state's policies relating to global warming. The website includes background information, news, and information about policies and initiatives.
http://www.climatechange.ca.gov/index.html

California Coastal Geoportal
The California Ocean Protection Council offers the California Coastal Geoportal which provides a user-friendly website for finding high priority coastal and marine datasets. The collection includes aerial photos, a map gallery, coastal habitats, and more, and includes links to the data sources.
http://portal.gis.ca.gov/geoportal/catalog/main/home.page

California Coastweeks
Join the California Coastal Commission's Public Education Program in celebrating Coastweeks from September 17 to October 9, 2005. The Commission will feature the events of participating organizations in a special section of their website, and conduct targeted outreach to publicize it. The deadline for submitting information is July 28, 2005. Follow the link on the left side to Coastweeks for more information.
http://www.coastal.ca.gov/publiced/pendx.html

California Coastweeks 2006
Join the California Coastal Commission's Public Education Program in celebrating Coastweeks from September 16-October 8, 2006. The Commission features the events of participating organizations in a special section of their website, and conducts targeted outreach to publicize it with an on-line calendar of events. The kickoff for the celebration is Coastal Cleanup Day.
http://www.coastal.ca.gov/publiced/coastweeks/coastweeks.html

California Current Ecosystem
The Scripps Institution of Oceanography researchers recently completed a cruise studying the California Current Ecosystem to better understand the effects of climate change on the pelagic ecosystem of the California Current System. Following the cruise, teachers will be creating lesson plans for high school classrooms that introduce and explore concepts such as ocean acidification, ocean warming and water column stratification, and changes in dissolved oxygen levels.
http://cce.lternet.edu/

California Current Marine Laws Database
All of the laws pertaining to the management of the California Current ecosystem have been compiled into a single, searchable, online database, publicly accessible through the Governance of the California Current Large Marine Ecosystem website. The data includes state laws from Washington, Oregon, and California, along with federal laws from the United States and Mexico.
http://www.cclme.org/index.php

California Derelict Fishing Gear Removal Project
California Derelict Fishing Gear Removal Project is a partnership between the California State Coastal Conservancy, the Northwest Straits Commission, and the National Fish and Wildlife Foundation. Anyone who loses fishing gear or observes derelict fishing gear underwater is encouraged to report their sighting. This project does not assess fault or blame, but rather encourages ocean users to report the presence of derelict gear, and hires experienced and certified SCUBA divers to remove gear from near-shore waters in a safe and environmentally sensitive manner.
http://www.derelictfishinggear.org

California Environmental Resources Evaluation System
The California Natural Resources Agency's California Environmental Resources Evaluation System (CERES) offers links to a myriad of environmental resources for students and teachers. Resources include the California Wetlands Information System, CERES' on-line environmental education with links to Natural and Social Sciences, English and Language Arts, Visual and Performing Arts, and more; and the California Ocean and Coastal Environmental Access Network.
http://www.ceres.ca.gov/index.html

California King Tides Initiative
The California King Tides Initiative encourages members of the public to document the highest seasonal tides (king tides) which occur along the state's coast. The photographs from the King Tides Initiative help visualize the impact of rising waters on the California coast.
http://californiakingtides.org/

California Ocean Uses Atlas
The California Ocean Uses Atlas Project is a public-private partnership between NOAA's Marine Protected Areas Center and the Marine Conservation Biology Institute. The project maps significant human uses of the ocean in state and federal waters of the coast of California. Data, maps, and analytical products are available. In addition, the aim is to create Ocean Uses Atlases for all U.S. waters and they are actively seeking interested partners in coastal states and regions, and in other public and private entities.
http://mpa.gov/science_analysis/atlas.html

California Regional Environmental Education Community
Find out the latest environmental education news and resources in California with the CREEC (California Regional Environmental Education Community) Networks' electronic newsletters, tailored to the different regions of California. Topics include community events, educational resources, training and professional development opportunities, grants/contests and more. Also, visit the website to access the free resource directory to find out about the other resources provided by local, state and federal agencies.

http://www.creec.org

California Roots & Shoots Festival
The daylong event is designed to increase young people's awareness of their role as the Earth's caretakers. In addition to student exhibits, the program will include live animals, multicultural music and dance, international children's art, craft activities, storytelling and displays by local conservation groups such as TreePeople and Heal the Bay.
http://www.huntington.org/ .

California ScienCenter Fun Lab
The California Science Center offers the Fun Lab website for kids, with games, videos, and hands-on activities. Color Full Inks offers an easy-to-do chromatography experiment, Build a Bug lets students create their own edible bug, and Habitat Match helps animals find their way home.
http://www.californiasciencecenter.org/FunLab/FunLab.php

California Tidepools App
Created by the Channel Islands National Marine Sanctuary and partners, this free iPhone app teaches about the creatures that live in California tidepools. The database contains photos, common and scientific names, habitat, eats and eaten by, fun facts, frequently asked questions, and more.
http://itunes.apple.com/app/california-tidepools/id497631839?mt=8

California and the World Ocean Conference Online Library
The California and the World Ocean '10 Conference website offers a presentation library of complete video recordings of concurrent and plenary sessions, along with PowerPoint presentations and photographs taken throughout conference events.
http://www.cal-span.org/events/CWO/2010/

California and the World Ocean Conference Theme Resources
This NOAA website offers links to online supplemental resources on major conference themes, including coastal and marine spatial planning, climate change, ocean literacy, sustainable economies and ecosystems, and freshwater.
http://oceanservice.noaa.gov/cwo2010/

Call Me Coral
This short musical video addresses coral's symbiosis with algae and parrotfish, as well as some of the issues facing coral survival.
http://www.youtube.com/watch?v=35ilnGM9EnU&feature=em-share_video_user

Callaloo
Callaloo is a new soap opera that has begun airing in nine countries. For the next two years, a cast of colorful characters will deliver messages about climate change, human health, and sustainable development through a radio drama designed to entertain listeners through love triangles, personal struggles, and happy endings. Listen to the first episode on this website.
http://www.justmeans.com/videos/Callaloo-Episode-1/1324.html

CaMPAM-L List Online
The Caribbean Marine Protected Areas Managers (CaMPAM) forum listserv is for people interested in marine protected areas management, science, policy, and

governance in the Caribbean region. The list is supported by the Gulf and Caribbean Fisheries Institute (GCFI), the United Nations Environment Programme Caribbean Environment Programme, and NOAA's National Ocean Service. The CaMPAM list was recently migrated to the GCFI website and management; login is unnecessary.
http://listserv.gcfi.org/SCRIPTS/WA-GCFI.EXE?A0=CAMPAM-L

Canadian Council for Geographic Education Teacher Resources
The Canadian Council for Geographic Education provides a range of educational materials relating to spatial sciences. Categories include the Canadian Atlas Online, Lesson Plans, Classroom Activities, and Teaching About Geographical Thinking. More than 100 lesson plans deal with the environment, cultural geography, oceanography, and international development.
http://www.ccge.org/resources/

Canadian Environmental Literacy Project
The Canadian Environmental Literacy Project (CELP) is developing a series of Canadian-focused educational modules, available on their website. The modules, oriented to introductory classes in environmental studies and environmental science in universities, colleges, and senior high-schools, include lectures, calculation exercises, and materials in support of discussion-type seminars. CELP currently has two modules with a marine focus which look at the ecological sustainability of aquaculture.
http://www.celp.ca .

The Canary Project
The Canary Project uses visual media, events, and artwork to visualize global warming in compelling ways, investigate questions about current ecological crises, and cultivate media attention.
http://www.canary-project.org/

Can't Take the Heat?
In the Data Analysis Teaching Activity from the Bridge and COSEE-NOW, *Can't Take the Heat?*, students get a hands-on introduction to heat capacity and its effects on our daily lives. Students use real-time and archived data from two NOAA ocean observing system buoys and two National Climate Data Center weather stations to investigate how water acts as a thermal buffer, and the ecological and practical applications this has.
http://www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive0909.html

Capacité
The Caribbean Natural Resources Institute (CANARI) now offers an English-language, online, quarterly newsletter, *Capacité*. The newsletter will highlight work in the region, share lessons learned and best practices, and more. Read about the Critical Ecosystem Partnership Fund, regional mentors, and more.
http://canari.org/

Cape Cod National Seashore
The Cape Cod National Seashore website includes sections on History & Culture, Photos & Multimedia, and For Teachers. Check out the lesson plans on whaling, History Keepers, and more.
http://www.nps.gov/caco/index.htm

Capitol Hill Ocean Week
If you weren't able to attend Capitol Hill Ocean Week 2013, the OceansLIVE team from NOAA's Office of National Marine Sanctuaries covered all three days of the symposium at the Newseum in Washington, D.C. Archived video includes coverage of all panel sessions, photos, and more.
http://nmsfocean.org/CHOW-2013/

Carbon Cycle Collection
NOAA's Education Resources website offers an updated section on climate with a Carbon Cycle Collection. The website offers multimedia, lessons and activities, real world data, background information, and more.
http://www.education.noaa.gov/Climate/Carbon_Cycle.html

Carbon Dioxide Aquariums Greenhouse Gas Lesson
This classroom activity from Portland Community College looks at carbon dioxide and its role in climate change. Students perform an in-class experiment using aquariums; the lesson includes step by step instructions.
http://www.pcc.edu/about/events/sustainability-training/documents/co2-aquariums-greenhouse.pdf

Carbonrally
Carbonrally is a web-based activism platform offering individuals and groups a simple and social way to have a measurable impact on climate change. The website is a place where many people can commit to small, positive actions over time. People can propose ideas for reducing carbon dioxide emissions, and the community chooses the best ideas to pursue as a team.
http://www.carbonrally.com/

Career Development Webinar Series
The Association of Polar Early Career Scientists is currently working with mentors and partners to develop a webinar series for members in order to assist them with their career development goals. You can register for upcoming free webinars or view archived recordings from the "Watch Past Webinars" page. Check out Making Science Animations, register for Getting Your Message Across, and more.
http://apecs.is/webinars

Career Guides List
This one-page website from the Scripps Institution of Oceanography Library offers a list of resources for those looking for information about careers in oceanography, marine science, and marine biology. The directory is divided into three sections: general guides for oceanography and marine science; guides for marine biology, marine mammals, zoos and aquariums; and other guides covering all of science.
http://scilib.ucsd.edu/sio/guide/career.html

CARIB Tails
Help track humpback whale migration through this Caribbean Citizen Science Project for Yachters. The project is an international research collaboration between NOAA's Stellwagen Bank National Marine Sanctuary's and partners. CARIB Tails relies on photo-identification techniques to help monitor the recovery of this endangered species. Participants contribute tail fluke photographs to monitor the movements, health, and behavior of individual humpbacks.

http://caribtails.org/

Caribbean Birds Festival
The Caribbean Endemic Bird Festival runs from April 22nd, Earth Day, until May 22nd, International Biodiversity Day, and is coordinated by the Society for the Conservation and Study of Caribbean Birds. Activities range from exhibitions of drawings and paintings by local schoolchildren, public lectures, photographic exhibitions, church services, bird-watching excursions, and theatrical productions in celebration of the region's rich bird life.
http://www.birdlife.org/news/news/2006/04/cebf.html

Caribbean Climate Wire
Small Island Developing States face a host of challenges, including limited infrastructure, reliance on agriculture and tourism, and more. Climate change superimposes another layer of risk, bringing sea level rise, flooded wetlands, higher temperatures, changes in precipitation and more intense hurricanes, and threatening coral reefs and fish stocks. The Inter Pres Service News Agency looks at the wide variety of local, national, and regional initiatives in the Caribbean that offer creative solutions to these problems.
http://www.ipsnews.net/news/projects/caribbean-climate-wire/

Caribbean Coral Data Center
The Caribbean Coastal Data Centre is the data archiving and management unit of the Centre for Marine Sciences at the University of the West Indies, Mona. The center provides a variety of monitoring data archives, including Reef Check, fish survey, and the annual Caribbean Coastal Marine Productivity (CARICOMP) monitoring data on coral reef communities, seagrass ecosystems and mangrove ecosystems.
http://www.ccdc.org.jm/mission%20statement.htm .

Caribbean Coral Reef Ecosystem Monitoring Program
This online database from the National Centers for Coastal Ocean Sciences' Biogeography Program presents ecosystem monitoring data gathered over the last five years from field studies in southwestern Puerto Rico and the U.S. Virgin Islands. You can query the database to provide specialized reports on species biomass, richness, abundance, and diversity. In addition to the data products, the website includes monitoring protocols, habitat maps, and links to some audiovisual materials.
http://biogeo.nos.noaa.gov/projects/reef_fish/

Caribbean Coral Videos in Spanish
The NOAA Central Library includes downloadable videos and documents. Three videos from the National Marine Fisheries Service, Office of Habitat Conservation, Caribbean Field Office, have been added to its catalog. They are: (1) Explorando los ecosistemas marinos de Puerto Rico; (2) Los corales y tu comunidad (Corals and your community); and (3) Programa de arrefices de coral (Coral Reef Initiative Program). Access the videos by visiting the library website, clicking on NOAA Library Catalog (NOAALINC).
http://www.lib.noaa.gov/

Caribbean Endemic Bird Festival
The 6th Caribbean Endemic Bird Festival was from April 22-May 22, 2007, with a theme of Global Warming. The purpose of the festival was to increase public awareness of the region's high endemism and rich bird life through activities such as talks, nature and birdwatching walks, the distribution of educational materials about birds, and more. The

website offers a downloadable festival poster, suggestions for activities, and links to resources on global warming and impacts on birds and wildlife.
http://www.scscb.org/

Caribbean Hub
Caribbean Hub is a new website under construction to facilitate professional communities with an interest in combating invasive species, climate change, and preserving biodiversity in the Caribbean. Though it is currently in start-up, the long term objective of the Hub is to bring together ideas, people, projects, experience, expertise, funds, and common resources.
http://www.caribbeanhub.net/

Caribbean Marine Etiquette PSA
For the Sea Productions and NOAA have released a Public Service Announcement targeting tourists visiting the USVI and Puerto Rico. The seven-minute film addresses marine debris, illegal collecting, and more, and offers the viewer solutions on how to behave responsibly around marine environments. The video can be viewed online, in English or Spanish.
http://www.forthesea.com/

Caribbean Natural Resources Institute
The Caribbean Natural Resources Institute seeks to create avenues for the equitable participation and effective collaboration of Caribbean communities and institutions in managing the use of natural resources. *Marine Protected Areas and Sustainable Coastal Livelihoods* is based on research and includes guidelines on developing effective management partnerships that involve local stakeholders; dealing with conflicts between the tourism and fisheries sectors, and sustaining fishery-based livelihoods.
http://www.canari.org/mpa.htm

Caribbean Protected Area Communication Programs
The Trust for Sustainable Livelihoods offers the downloadable publication, *Protected Areas Management in the Caribbean: Core Themes for Education, Awareness, and Communication Programmes*. Information for the preparation of the report was gathered from a literature review and a survey of protected areas professionals in the wider Caribbean region.
http://www.sustrust.org/documents.html

Caribbean Sea Grant Publication Database
The University of Puerto Rico Sea Grant Program has developed a research program focused on conservation and management of marine and coastal resources in the Caribbean. The website includes a publication and information database with peer-reviewed articles, white papers, and more, specific to marine and coastal resources in the Caribbean. Check out *How to use our Publication Database* before use.
http://seagrantpr.org/caribbean/how-to-use-our-publication-database/

Caribbean Volcano Forecast
The *Holocene Volcanic Activity in the Caribbean Plate Margins: Forecast and Risk Assessment* is available from R.B. Trombley, principal research volcanologist for the Southwest Volcano Research Centre in Apache Junction, Arizona. The website will be will be updated as appropriate. Additional Caribbean plate information is also posted.
http://www.ig.utexas.edu/CaribPlate/forum/volcanoes/

Caribherp
Caribherp contains information on amphibians and reptiles of the Caribbean Islands. It serves as a checklist of what occurs in the region as well as a quick identification guide to the species. Approximately 2000 images, maps, and selected frog calls are presented, along with an integrated open-access journal, *Caribbean Herpetology*.
http://www.caribherp.org/

CARIWIG Project
The CARIWIG project will address issues of bias and scale in current climate model projections of the weather for the Caribbean. The project will focus on locally relevant information on the weather impacts of climate change, training for stakeholder technical staff in the use of such weather information, the development of support networks within the region, and development of partnerships with UK research institutes specializing in the management of a range of hazards and impacts.
http://www.cariwig.org/

Cartography 2.0
Cartography 2.0, from the University of Wisconsin Madison's Department of Geography, offers a free knowledge base and e-textbook for students and professionals interested in interactive and animated maps. The website covers map animation, virtual globes, elements of design, and more.
http://cartography2.org/

Casco Bay Curriculum
Friends of Casco Bay developed the place-based Casco Bay Curriculum to help teachers of grades 4-6 incorporate locally-focused environmental education into their classrooms to instill an ethic of stewardship by helping students understand the immediate marine world around them through the use of hands-on science, inquiry activities, and actual data.
http://friendsofcascobay.org/curriculum.aspx

The Case of the Wacky Water Cycle
The NASA SCIence Files™ series is a distance learning initiative to integrate and enhance the teaching of mathematics, science, and technology in grades 3-5. Each episode includes hands-on classroom and home activities, virtual field trips, subject matter experts, a video broadcast, educator's guide and web-based activities and materials. *The Case of the Wacky Water Cycle* began airing October, 2004.
http://scifiles.larc.nasa.gov/

Catalog of Conservation Social Science Tools
The Society for Conservation Biology's Social Science Working Group is a global community of conservation scientists and practitioners. The group is dedicated to strengthening conservation social science and its application to conservation practice. The website offers a catalog designed for conservation practitioners, planners, students and researchers interested in the social dimensions of conservation.
http://www.conbio.org/WorkingGroups/SSWG/catalog/index.cfm

Catastrophe Insight
The Catastrophe Insight portal draws on the aggregated data from Aon Benfield's Impact Forecasting team and is designed to offer information on global natural catastrophe

events. It provides a gross breakdown by disaster type of economic/insured loss data for the current year plus the previous ten years. In addition, check out the Annual global climate and catastrophe report: impact forecasting – 2013 which evaluates the impact of the natural disaster events that occurred worldwide during 2013.
http://www.preventionweb.net/english/professional/publications/v.php?id=36073
http://catastropheinsight.aonbenfield.com/Pages/Home.aspx

Catch the Science Bug
This educational science website, sponsored by Best Buy Children's Foundation, offers a variety of science activities meant to increase science literacy, raise environmental awareness, and introduce different careers in the sciences. The site also provides the user with video clips from the PBS Rhode Island television series, interactive online activities, and educational activities.
http://www.sciencebug.org/

Catch the SEACOOS Wave!
Visit the Southeast Atlantic Coastal Ocean Observation System (SEACOOS) Virtual Waves Classroom and learn about the properties of waves through the glossary and other resources on this website. The website includes information about research, news, and a *Community and Classrooms* link to the waves classroom and teacher workshop information. The site provides access to real time wave data, lessons plans, and a four-color *Making Waves* poster.
www.seacoos.org

Catchment to Reef
The Catchment to Reef poster and booklet offer an understanding of connections between land, sea, and reef, highlighting ecological and physical connections and impacts affecting the coastal waters of the Great Barrier Reef. It outlines the key freshwater connections and processes and describes the impacts of human activities on the freshwater environments of catchments and the consequences for the marine environment. Materials can be downloaded from the website.
http://www.catchmenttoreef.com.au/Start.html

Cayman Islands Twilight Zone
From May 20-June 10, 2007, a scientific team will study coral reefs of the "twilight zone" in the Caribbean Sea between Jamaica and Cuba. This shore-based mission will employ new diving techniques that allow scientists to personally visit deep-water ecosystems without the need for expensive submersibles. NOAA's Ocean Explorer website coverage for this mission includes Biotechnology, Technical Diving, and Biodiversity content essays written especially for this mission.
http://oceanexplorer.noaa.gov/explorations/07twilightzone/welcome.html

Celebrate Urban Birds
From Cornell University, this website helps city residents create quality food and water resources, shelter, and nesting sites for birds in small spaces.
http://celebrateurbanbirds.org/learn/gardening/

Celebrate World Oceans Day with Dr. Seuss
Partners in The Ocean Project network can take advantage of the opportunity to download the Dr. Seuss' One Fish World Oceans Day materials for free. Materials include a manual, games and activities, and more.

http://theoceanproject.org/wod/seuss/

Census of Marine Life Reports
The Census of Marine Life offers a first baseline picture of ocean life and the website hosts reports and syntheses which can be used to forecast, measure, and understand changes in the global marine environment, as well as to inform the management and conservation of marine resources. Check out A Summary for Decision Makers: Scientific Results to Support the Sustainable Use and Conservation of Marine Life; First Census of Marine Life 2010: Highlights of a Decade of Discovery; and much more.
http://www.coml.org/

Center for Improved Engineering and Science Education (CIESE)
CIESE at the Stevens Institute of Technology sponsors and designs interdisciplinary projects that teachers throughout the world can use to enhance their curriculum and learn problem-solving through use of the Internet. The *Virtual Gulf Stream Voyage* is a allows students to access real time ocean & atmospheric data and historical primary source materials to explore real world problems, and *The Stowaway Adventure--Adventures on the High Seas,* offers Language Arts and Social Studies activities.
http://www.k12science.org/currichome.html .
http://ciese.org/currichome.html

Center for International Earth Science Information Network
The Earth Institute at Columbia University hosts The Center for International Earth Science, specializing in on-line data and information management, spatial data integration and training, and interdisciplinary research related to human interactions in the environment. The collection includes climate change resources for the New York metropolitan area, GIS training opportunities, links to educational resources, and, especially, data resources.
http://www.ciesin.columbia.edu/

Center for Remote Sensing of Ice Sheets
The Center for Remote Sensing of Ice Sheets (CReSIS) focuses on topics related to global climate change and remote sensing. The center combines the expertise of researchers from universities and businesses in order to study and conduct research that will result in the technology necessary to achieve a better understanding of the mass balance of the polar ice sheets and its contribution to global climate change. The website includes an extensive section on K-12 education.
http://www.cresis.ku.edu/EducationIndex.htm

Census of Marine Life
The Census of Marine Life is a global network of researchers in more than 80 nations engaged in a 10-year scientific initiative to assess and explain the diversity, distribution, and abundance of life in the oceans. Each Census project has an education and outreach initiative. These include Arctic Ocean Biodiversity, Abyssal Marine Life, Natural Geography In Shore Areas, and more.
http://www.coml.org/

Census of Marine Life
The Census of Marine Life assesses the diversity, distribution, and abundance of ocean life and to explain how it changes over time. The different elements include: Initial Field Projects; History of Marine Animal Populations; Ocean Biogeographic Information

System; Future of Marine Animal Populations; Scientific Committee on Oceanic Research Working Group; and Known, Unknown and Unknowable.
www.coml.org

Census of Marine Life
The Census of Marine Life international web portal is constantly growing. This global network of researchers in more than 70 nations is engaged in a ten-year initiative to assess and explain the diversity, distribution, and abundance of marine life in the oceans -- past, present, and future. Active websites include Arctic and Antarctic, abyssal, shore areas, deep-water chemosynthetic ecosystems, and more.
http://www.coml.org/descrip/nagisa.htm

Center for Alaskan Coastal Studies
The Center for Alaskan Coastal Studies (CACS), based in Homer, Alaska, provides spring school field trip programs during April and May to diverse rocky beaches with extreme tides that range from +24 feet to –5 feet, a salt marsh, bog, lake, coastal forest trail system and sites of archaeological and geological interest. CACS has coastal education curriculum units for grades 4-12, along with many other educational programs.
http://www.akcoastalstudies.org

Center for Environmental Education Online
The Center for Environmental Education Online is a dynamic resource for educators and students. The Curriculum Library includes reviewed curriculum and lesson plans on topics ranging from the water cycle to sustainable economics. Additional resources include Educating for Sustainability and an easy-to-read online newsletter which includes environmental education information, upcoming events, and grant opportunities.
http://www.ceeonline.org/default.cfm

Center for International Environmental Law
The Center for International Environmental Law works to solve environmental problems through a variety of advocacy and education programs. The sections, including Biodiversity, Human Rights & Environment, Climate Change, and more, contain links to calendar events, full-text publications, and information about their goals for each topical area. The website also includes information about available fellowships, internships, and potential job opportunities
http://www.ciel.org/

Center for Microbial Oceanography: Research and Education
The NSF-sponsored Science and Technology Center is designed to facilitate a more comprehensive understanding of the diverse assemblages of microorganisms in the sea. The website offers background information about microbial oceanography, microscopic slideshows, and education and outreach materials.
http://cmore.soest.hawaii.edu/index.htm

Center for North American Herpetology
The Center for North American Herpetology serves as a data bank for information about North American amphibians, turtles, reptiles, and crocodilians, and promotes their study and conservation. There are links to websites for information, on-line collections, publications, and much more.
http://www.cnah.org/

Center for Ocean Solutions
Stanford University, the Monterey Bay Aquarium, and the Monterey Bay Aquarium Research Institute have joined forces to create the Center for Ocean Solutions. In addition to developing new knowledge to solve ocean challenges, they will reach out to decision-makers to translate the results of marine science and policy research into action; offer educational and research opportunities; highlight these issues in the media; and sponsor outreach programs .
http://www.centerforoceansolutions.org/

Centre for Evidence-Based Conservation
The Centre for Evidence-Based Conservation conducts and widely disseminates systematic reviews of evidence pertaining to questions identified by decision-makers in the conservation and environmental sectors. The Centre aims to investigate the effectiveness of a diverse variety of actions, from practical site management to national and international policy. In addition, the center seeks to provide training in conducting, interpreting, and utilizing the results of systematic reviews.
http://www.cebc.bangor.ac.uk/index.php.en?menu=0&catid=0

Cephalopod Lesson Plans
This collection of lesson plans, created by the Bermuda Biological Station for Research, highlights color change in cephalopods. Additional links include articles, FAQs, species information, and photos.
http://www.thecephalopodpage.org/cephschool/

CERMES Guides
The mission of the Centre for Resource Management and Environmental Studies at the University of the West Indies is to make a significant contribution to sustainable development. The *Information and Reports* section of the website includes a variety of manuals, including the downloadable *Reef Watchers Under H2O Guides, The Junior Coral Reef Ambassador Training Manual*, and more.
http://www.cavehill.uwi.edu/cermes/folkestone_info.html

Cetacean Curriculum
The American Cetacean Society offers a downloadable teacher's guide to introducing and using whales, dolphins, and porpoises in the classroom. The curriculum contains basic background information on cetaceans and offers ideas for activities to engage students. The website also includes individual cetacean fact sheets.
http://www.acsonline.org/education/curriculum/index.html

Cetacean/Right Whale Curriculum
The University of Florida hosts a fourth grade cetacean/right whale curriculum, developed in cooperation with NOAA Fisheries and Sea Grant. Be sure to check out the rest of the education resource links, including a manatee curriculum and more.
http://stjohns.ifas.ufl.edu/sea/rightwhalecurriculum.html

CHAMP
The Coral Health and Monitoring Program (CHAMP) is part of NOAA's Atlantic Oceanographic and Meteorological Laboratory. The CHAMP website offers educational materials about coral spawning, bleaching, and more. In addition to many research projects, the program hosts the Coral-List listserver, which provides a forum for Internet

discussions and announcements pertaining to coral reef ecosystem research, conservation, and education.
http://www.coral.noaa.gov/

Changing the Atmosphere: Anthropology and Climate Change
This report from the American Anthropological Association's Global Climate Change Task Force offers a guiding document as to how anthropological contributions can inform issues related to global climate change. Chapters discuss human causes of climate change, lessons learned about human adaptation, the importance of local and community engagement, and more.
http://www.aaanet.org/cmtes/commissions/upload/GCCTF-Changing-the-Atmosphere.pdf

Changing Climate for Endangered Species
NOAA Fisheries scientists are working to ensure that the Endangered Species Act, which turns 40 this year, remains effective in the face of a changing climate. A special section in the latest issue of *Conservation Biology* highlights eight papers authored by NOAA scientists and their research partners, which consider strategies to incorporate climate change into our decision-making for listed species.
http://www.fisheries.noaa.gov/stories/2013/12/12_4_2013climate_and_the_esa.html

Changing Habitats...Vanishing Species
Harvard@Home produces web-based video programs with in-depth exploration of topics of general interest to the Harvard community and the broader public. *Changing Habitats…Vanishing Species* presents video clips and slides from a symposium presented in November 2004 about how environments are changing and why species are being lost. Presentations discuss the root causes, including climate and land use change, and their impact on species' habitats.
http://athome.harvard.edu/dh/chvs.html

Changing Oceans Cruise
The Changing Oceans Cruise is a 35-day scientific expedition, begun May 17, 2012. The mission is to examine the potential impact of changes in the temperature and chemistry of the oceans on cold-water coral reefs and the associated reef creatures. Scientists will survey and sample the deep water coral communities; study the biology, chemistry and physics of cold-water coral sites; and conduct onboard experiments. Follow along through the blogs, view photos, read background information, and more.
http://changingoceans2012.blogspot.com/

Changing Public Behavior - Online
Changing Public Behavior: People and the Environment is a self-study course designed for natural resource professionals, extension educators, and environmental educators who work with communities. Through the seven units, participants build skills in identifying and analyzing behavior change opportunities and draft a plan for increasing people's involvement in an environmental situation.
http://wateroutreach.uwex.edu/CPBhomepage.cfm
http://campus.extension.org/enrol/index.php?id=548

Changing Tides
Changing Tides: A Series of Ocean Discussions by Smithsonian's Museum of Natural History and COSEE, is a series of talks by ocean scientists about current research and

how it is helping to change the tide in ocean science and conservation. Live webcasts can be heard online and links to recordings will be posted after the webcast footage is processed. Sign up for the Ocean Portal Newsletter for notification of future lectures. Check out the Educators' Corner, with links to lesson plans and activities and more.
http://ocean.si.edu/ocean-videos/changingtides/

Changing Your Latitude
Join an expedition to Palmer Station, Antarctica and travel aboard the 230-foot icebreaker Laurence M. Gould during the 18th Field Research Season through the Palmer LTER Education & Outreach Program interactive blog, *Changing Your Latitude*. Visitors can track the ship, explore the environment with Google Earth, view videos, and more. Educators can download instructional materials that parallel the scientific research, and encourage students to post questions directly to the scientists.
http://pal.lternet.edu/outreach/blogs/cruise201001/

Channel Islands Argonauts Program
For the third year in a row, several local organizations are teaming up to provide an opportunity for 20 outstanding middle school students to become members of an elite group—the Channel Islands Argonauts. This group will have a chance to explore the Channel Islands region with researchers and staff from the Channel Islands National Marine Sanctuary and National Park, as well as compare and contrast the islands with the wetlands of the bayou as part of the JASON Expedition: Disappearing Wetlands.
http://channelislands.noaa.gov/edu/shoretosea.html .

Charles W. Morgan Sets Sail
Following a six-year restoration, explorers from Mystic Seaport will sail the *Charles W. Morgan* to Stellwagen Bank National Marine Sanctuary following other ports of call along the New England coast. Instead of hunting whales, the last wooden whaleship afloat will sail as an ambassador for ocean conservation. Follow along with live broadcasts from the ship, with commentary from historians, scientists, authors, and artists, July 11-13, 2014 at 10-, 12-, and 14:00.
http://innerspacecenter.org/oceanslive/upcoming-events

Chasing Ice
Through the generous donations of various small grants and efforts of small grassroots groups, you are invited to reserve two tickets to the opening weekend of 'Chasing Ice', a film depicting the rapid melting of glaciers through images only the big screen can provide. A limited number of tickets are available on a first come, first served basis
http://furstaccess.com/event-master.aspx?eid=2014&lid=13

Chesapeake Bay Ecosystem Atlas
Chesapeake Environmental Communications and NOAA's National Center for Coastal Ocean Sciences offer the free Chesapeake Bay Ecosystem Atlas - An Interactive Guide to Chesapeake Bay iBook and its companion Teacher's Edition. The Atlas makes extensive use of animations, video, and interactive graphics. The Teacher's Edition includes suggested discussion questions, classroom activities, field trips for hands-on learning, and additional sources for more information by topic.
https://itunes.apple.com/us/book/chesapeake-bay-ecosystem-atlas/id1020777102?mt=13
https://itunes.apple.com/us/book/chesapeake-bay-ecosystem-atlas/id1020793944?mt=13

Chesapeake Bay Interpretive Buoy System
The NOAA Chesapeake Bay Interpretive Buoy System is a sensor-to-user information delivery system focused on the Chesapeake Bay and its surrounding estuarine environment. "Talking buoys" will serve as interpretive guide posts, linking trail visitors—whether they be right next to the buoy in a kayak or at home on their computer—with information about the buoy location and nearby history and culture via cell phone or Internet-accessible devices.
http://www.buoybay.org/site/public/

Chesapeake Bay - Views of the National Parks
The National Park Service features the Chesapeake Bay for its latest edition of Views of the National Parks, an online educational resource. This edition of Views provides readers with a background in the natural world of the Chesapeake, its geologic formation as an estuary, and its diverse ecosystems and species, as well as an understanding of the human history and cultural environment of the Bay watershed.
http://www.nature.nps.gov/views/layouts/Main.html#/CBPO/

Chestory Virtual Archive
The Center for the Chesapeake Story Virtual Archive contains decades of educational materials focused on environmental and cultural studies developed by Tom Wisner. The website provides example activities and lessons containing strategies that can be applied to any watershed.
http://www.chesapeake-envliteracy.com/

Children & Nature Network
The Children & Nature Network supports those working to reconnect children with nature. The Natural Teacher Network is a new initiative to provide tools and resources and a peer-to-peer network for teachers who make outdoor learning a priority. Sign up for the monthly newsletter for news, reports, and updates on the children and nature movement.
http://www.childrenandnature.org/

Children & Nature Network Connect
C&NN Connect was created to support people and organizations working worldwide to reconnect children and nature. The website offers a peer-to-peer online network as a place to participate, contribute, promote, and share what participants are doing to connect children with nature.
http://childrenandnature.ning.com/

Children and Nature
This special edition of Fish & Wildlife News provides a glimpse of what U.S. Fish & Wildlife Service (FWS) employees are doing to connect children with nature. From the Don Edwards San Francisco Bay National Wildlife Refuge, where youngsters sample brine shrimp in the salt ponds or investigate bird and plant life with their parents, to the Chesapeake Bay Field Office, where students create schoolyard habitats outside their classroom door, the FWS is helping people of every age to get outdoors.
http://www.fws.gov/news/pdf/News_SuFall07.pdf

Children in Nature Programs
The National Park Service hosts hundreds of replicable programs for kids in parks. You can search their data base by a variety of criteria, or leave the fields blank to list all programs.
https://pwrcms.nps.gov/customcf/apps/cnps/Bestpractices/index.cfm

Children's Environmental Literature Bibliography
The Children's Environmental Literature Bibliography is available online courtesy of Wisconsin's Project WILD, Project Learning Tree, and Project WET programs. The bibliography contains more than 400 books, over 300 of them new additions. For easy teacher reference, the books are grouped according to topic area (including Aquatic Ecosystems and the Water Cycle and Fish) and age group.
http://www.dnr.state.wi.us/org/caer/ce/eek/teacher/childlit.htm

Chris Jordan Photographic Arts
Chris Jordan depicts mass consumption in his artwork. He makes large-format, long-zoom artwork from data about the items we make and consume every day. He takes factoids and gives them visual life, such as "60,000 plastic bags, the number used in the US every five seconds". Check out Running the Numbers; Midway: Message from the Gyre; and much more.
http://www.chrisjordan.com/gallery/rtn/#cig-butts

Christmas Bird Count
The 114th Annual Audubon Christmas Bird Count will take place December 14, 2013-January 5, 2014. The longest running Citizen Science survey in the world, the Christmas Bird Count provides critical data on population trends.
http://birds.audubon.org/christmas-bird-count

Christmas Bird Count
The Audubon Christmas Bird Count, December 14, 2005 – January 5, 2006, December 14, 2009-January 5, 2010.s part of the oldest and largest citizen science event in the world. For over a hundred years, people have gathered together during the winter holiday season to count birds. Your local count will occur on one day between those inclusive dates. Check out the lesson plans at the North American Bird Project.
http://www.audubon.org/bird/cbc/getinvolved.html
http://birdcentral.net/lessonplans.htm
http://www.audubon.org/bird/cbc/

Christmas Creatures
Ann McElhatton has set up a Pinterest page with Christmas and winter-themed marine organisms. Enjoy!
http://www.pinterest.com/beachcscientist/christmaswinter-themed-marine-organisms/

CIESE Online Classroom Projects
The Center for Improved Engineering and Science Education (CIESE) sponsors and designs interdisciplinary projects that teachers can use to enhance their curriculum through use of the Internet. The focus is on projects that utilize real-time data from the Internet, and collaborative projects that reach peers and experts around the world via the Internet. Each project has a brief description and links to the National Science Standards it supports.
http://www.k12science.org/currichome.html

Circumnavigating the Globe
Follow Erden Eruc as he rows across the Pacific Ocean and circumnavigates the world using only human powered transportation. His current location is in the Atlantic Ocean. Read his dispatches, track his progress, and more.
http://whale.wheelock.edu/whalenet-stuff/Erden/

Cities and Oceans
The World Ocean Observatory offers Cities and Oceans, the latest website in their series of events exploring ocean issues. This site offers multimedia presentations, interviews, and a wide array of information and images.
http://www.thew2o.net/events/cities_oceans/index.html

Citizen Science Association
Citizen Science Association is a new organization and offers free, inaugural membership. The association supports practitioners in the broad field of public participation in scientific research, and aims to advance a global and cross-disciplinary field of practice.
http://citizenscienceassociation.org/

Citizen Science in Coastal and Marine Management
The *Marine Ecosystems and Management (*MEAM) newsletter, Vol. 7, No. 1, features a discussion of citizen science in coastal and marine management.
http://depts.washington.edu/meam/MEAM32.pdf

Citizen Science – Precipitation Measurements
The Community Collaborative Rain, Hail and Snow Network is a non-profit, community-based network of volunteers measuring and mapping precipitation (rain, hail and snow). By using low-cost measurement tools, stressing training and education, and utilizing an interactive website, the aim is to provide high-quality data for natural resource, education, and research applications.
http://www.cocorahs.org/

Citizen Science in Space
Scientists need your help with real-world space research. Zooniverse features a number of space science projects that need keen observational skills to find information. Current citizen science projects include How do Galaxies Form? Study explosions on the Sun, and more.
https://www.zooniverse.org/projects#space

CITIZENShift
CITIZENShift is a National Film Board of Canada website dedicated to citizen engagement and social change. The website integrates written, audio, and visual media and provides a space where filmmakers and citizens can share knowledge, be entertained, and debate social issues. The focus on biodiversity under the Reel Community link includes *Nomads of the Ocean*, *Reefs: Rainforest of the Ocean*, and *Lords of the Arctic*. The website also includes background information, and photos.
http://citizen.nfb.ca/onf/info?aid=3423

City of Portland Wetlands Education
The City of Portland (Oregon) Environmental Services, in partnership with City of Portland Parks & Recreation, has been working for two years with all the 6th graders in the David Douglas School District to carry out wetlands investigations and restoration planting. They have two mandatory field trips, and provide several optional classroom programs. All of the programs are free for the students. Pre-field trip classroom options include a *Riparian Restoration* program and *Water Quality Testing in the Classroom*. http://www.cleanrivers-pdx.org/clean_rivers/index.htm .

Civic Education Project
This Earth Day Network program helps teachers to teach students about a selected local environmental problem and take action to improve that issue. The program currently seeks applicants for the spring semester in Los Angeles, New Orleans, Cleveland, Chicago, Cincinnati, Albuquerque, and Washington, DC.
http://www.earthday.net/involved/civic_education/CEP_intro.aspx

CLASS Data Library from NOAA
The Comprehensive Large Array-data Stewardship System (CLASS) is an electronic library of NOAA environmental data. This website provides capabilities for finding and obtaining those data. CLASS is NOAA's premiere on-line facility for the distribution of NOAA and US Department of Defense Polar-orbiting Operational Environmental Satellite (POES) data, NOAA's Geostationary Operational Environmental Satellite (GOES) and derived data. CLASS provides data free of charge.
http://www.class.noaa.gov/nsaa/products/welcome

Classroom Apps
From KQED News' MindShift, Teacher Recommended: 50 Favorite Classroom Apps reviews a variety of technology apps for use in the classroom. Categories include apps to acquire information, apps which help organize or share information, and knowledge transfer apps.
http://ww2.kqed.org/mindshift/2015/07/29/teacher-recommended-50-favorite-teaching-apps/

Classroom Companion
The National Geographic has developed a new online resource called a Classroom Companion series, which includes K-12 lessons, maps, photographs and multimedia resources. While the materials can be listed by category or alphabetically, the keyword search yields the most useful method of finding resources.
http://www.ngsednet.org/community/resources_category.cfm?community_id=168

Classroom Connection
Join the Center for Dark Energy Biosphere Investigations (C-DEBI) for six weeks of scientist-classroom interaction, starting April 9, 2012. The Classroom Connection engages students in deep ocean science and exposes them to new concepts and oceanographic tools, while addressing federally-mandated curriculum standards. The program offers hands-on classroom lessons, interviews with scientists and crew members, shipboard blogs, and more.
http://www.darkenergybiosphere.org/classroomconnection/

Classroom Data Activities
The BRIDGE collaborated with the Monterey Bay Aquarium Research Institute to develop two classroom data activities. ***Pumping Iron*** focuses on ocean fertilization, and ***Hold the Anchovies*** focuses on climate phenomena and fish populations. These activities and several others are available as part of the EARTH (Education and Research Testing Hypotheses) program. EARTH allows integration of real-time data with existing educational standards and tests curriculum in an interactive and engaging way.
http://www.marine-ed.org/bridge/index_archive0504.html
http://www.marine-ed.org/bridge/indexarchive0903.html
http://www.mbari.org/education/EARTH/default.htm

Classroom Earth
Classroom Earth now offers a full spectrum of educational and professional development materials for K-12 students and teachers. The website database is searchable by grade level, topic, and academic discipline, and includes a Nature Center Map where teachers can connect with nature nearby.
http://www.classroomearth.org/

Classroom Earth
The National Environmental Education & Training Foundation (NEETF) launched Classroom Earth, a free website to help educators find the best and most usable environmental education programs available. It is a collection of environmental education programs and resources for K-12 teachers, parents, and students. This new site will help educators, after-school providers, and home-schooling parents to get started or improve their skills in environmental education.
www.ClassroomEarth.org .

Classroom Exploration of the Oceans: An Online Virtual Teacher Conference
The National Geographic Society and NOAA's Office of Ocean Exploration (OE) hosted a 9-part virtual teacher workshop series using ocean exploration to enhance learning in the classroom. Teachers were provided with lesson plans and information, with workshop information linking to Geographic's Ocean Atlas Teacher's Guide, OE's lesson plans, and the Oceans Scope and Sequence Matrix for K-12 Teachers.
http://coexploration.org/ceo

Classroom Exploration of Oceans 2005
Three online virtual teacher workshops focus on efforts currently underway to protect and conserve special places in the ocean and explore still unknown areas of the deep ocean. They will focus on new discoveries being made in ocean exploration, delve into historic and physical events newly found or still hidden in the ocean depths, and discuss what we still need to know for effective marine conservation and management.

- Oceans for Life: January 24 - February 6, 2005
- Mysteries and Sirens of the Deep: April 4 - 17, 2005
- Extreme Environments: October 10 - 23, 2005

http://www.coexploration.org/ceo/

Classroom Exploration of Oceans – Maritime Heritage Online
This online virtual teacher workshop focuses on maritime heritage: Mysteries and Sirens of the Deep: April 4-17, 2005. The upcoming keynotes are Maritime Heritage: Resources Revealed in the Hawaiian Islands; The Steamship Portland - Discovering and Managing our Maritime Heritage and the Technologies That Take Us Beneath the Blue

Horizon; and Exploring Shipwrecks Together: How one program helps scientists and the public connect with the past.
http://www.coexploration.org/ceo/

Classroom and Field Activity Resources
This website from the University of Florida Sea Grant hosts activities which have been created by or suggested by Florida marine educators. Topics include aquarium maintenance and activities, field sampling, and much more. While you're on the website, check out all the links to other materials and information, including marine debris, sea oats, educator slideshows and activities, and much more.
http://stjohns.ifas.ufl.edu/Sea/activities.html

Classroom Guides
Edutopia offers free classroom guides and educational downloads with useful tips for teachers, school administrators, and parents. Check out tips for classroom management, teaching with new media, and more.
http://www.edutopia.org/classroom-guides-downloads

Classroom Resources
NSTA assembled a team of educators to identify and review resources such as lesson plans, video simulations, science kits, and more, that support the Next Generation Science Standards and the Framework for K-12 Science Education (Framework and science standards). Check back often, as new resources will be added daily.
http://ngss.nsta.org/Classroom-Resources.aspx

Classroom Resources
The National Science Foundation's Classroom Resources offers a collection of lessons and web resources arranged by subject area for classroom teachers, students, and others. Most of these resources come from the National Science Digital Library. Topics include Arctic & Antarctic, Earth & Environment, and more.
http://www.nsf.gov/news/classroom/index.jsp

Clean Air-Cool Planet
Clean Air-Cool Planet's goal is to solve the global warming problem through civic engagement, education, and effective policy. Check out the sections For Science Centers, For Campuses, and Get Informed for links to information and useful tools.
http://www.cleanair-coolplanet.org/

Clean Air Lesson Plans
The Clean Air Campaign and the Georgia Environmental Protection Division have developed five new air quality curriculum units for grades 4 to 8. Each grade unit includes two to three lesson plans, along with a Teacher Resource Manual and support materials, which educate students about air chemistry, health and human behaviors, as well as the air pollution challenges. The lessons cross several subjects including science, social studies, geography and English.
http://www.cleanaircampaign.com/index.php/cac/for_schools/clean_air_lesson_plans

Clean Beaches Blue Wave Campaign
The Clean Beaches Council is a non-profit organization devoted to sustaining America's beaches. Their flagship program is the *Blue Wave Campaign*—America's first environmental certification program for beaches. The goal of Blue Wave is to promote

public awareness and voluntary participation in beach sustainability, including water quality, habitat conservation, public information and education.
http://www.cleanbeaches.org/bluewave/bluewave.cfm

CLEAN Network
The Climate Literacy and Energy Awareness Network (CLEAN), a part of the National Science Digital Library, provides a reviewed collection of resources coupled with the tools to enable an online community to share and discuss teaching about climate and energy science. The activities have been vetted and aligned to the Climate Literacy Principles, AAAS Benchmarks, National Science Education Standards, and other standards. The project will offer virtual workshops, social networking tools, and more.
http://cleanet.org/index.html

Clean Sweep U.S.A. - Solid Waste Education
Keep America Beautiful has a new education website geared for middle grades teachers and students -- Clean Sweep U.S.A. There is a wealth of information, activities, lessons, and links about solid waste.
www.kab.org/kids .

Clean Water for the 21st Century
The Wyland Ocean Challenge offers the Clean Water for the 21st Century classroom program, exploring the world of aquatic ecosystems above and below using tools and techniques from science and art. The downloadable materials include a teacher's guide containing detailed art and science activities, background information, tips on using art in your classroom, and standards alignment charts. Eco-Guides offer a full color student supplement with articles, fun facts, people profiles, images, and a set of organism cards.
http://www.wylandoceanchallenge.org/index.cfm?do=part2

Cleaning Water
Cleaning Water, from NASA, is a lesson in which students (Grades 3-5) create and test a system to filter "gray" water. In this lesson, students will design and build their own water filtering system and collect data to compare water before and after filtering. The activity is downloadable from the website, and is available in English and Spanish.
http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Cleaning_Water_Activity.html

Clearing Magazine
CLEARING, the Pacific Northwest Journal of Community-based Environmental Literacy Education, is a print and online publication that provides information that can be used in classroom or outdoor settings. It includes activities and lesson plans, curriculum resources, book and resource reviews, program profiles, opinions and perspectives, and more. Check out the online lesson plans and activities, lesson plan exchange, student-reviewed resources, and more.
http://clearingmagazine.org/

Climate Action: Energy For A Changing World
The European Union member nations agreed to work on a package of proposals that will help fight climate change and promote renewable energy. This website serves as the clearinghouse for the information related to this ambitious project. Information is available in all of the European Union languages. There are country fact sheets, working documents, reports on emissions trading schemes, and more.

http://ec.europa.eu/energy/climate_actions/

Climate Adaptation
EcoAdapt has released a report on climate adaptation, *The State of Marine and Coastal Adaptation in North America: A Synthesis of Emerging Ideas*. The downloadable report summarizes climate impacts and provides summaries and examples of adaptation actions implemented throughout Canada, United States, and Mexico.
http://www.cakex.org/virtual-library/1615

Climate Adaptation Knowledge Exchange
EcoAdapt and Island Press have launched CAKE - the Climate Adaptation Knowledge Exchange. CAKE is aimed at building a shared knowledge base for managing natural systems in the face of rapid climate change. The website offers a Virtual Library, Tools, Directory, and more. Be sure to check out the free CAKE and Ice Cream offer.
http://www.cakex.org/

Climate Adaptation Strategy
The National Fish, Wildlife and Plant Climate Adaptation Strategy is available for downloading. The strategy was developed by more than 15 federal, state, and tribal agencies over a two-year public process and is meant to help decision-makers prepare for and reduce the current and future impacts of climate change on species, habitats, and the people and economies that depend on them.
http://www.wildlifeadaptationstrategy.gov/

Climate & Atmosphere
The Bridge's Climate & Atmosphere pages link to a myriad of topical resources, including climate change, hazards, paleoclimatology, and much more.
http://www2.vims.edu/bridge/search/bridge1output_menu.cfm?q=climate

Climate Bingo
Climate Kids offers the trip game, Climate Bingo. Players in a car or on a bus look for things that are good for the climate and environment. The bingo generator creates a unique card for each player
http://climatekids.nasa.gov/bingo/

Climate Challenge
Climate Challenge is an educational online game that invites players to learn more about climate science and to test their knowledge. The game combines practical steps to reduce one's carbon footprint with questions about future climate-related conditions that we cannot answer today, but will be able to answer in the future. It allows players to compare their answers to the experts' and, when available, see how both predictions compare to real-world measurements. Free registration is required.
http://www.ecoresearch.net/climate-challenge/

Climate Change
This website from the EPA offers a myriad of resources about climate change, including background information; laws and regulations; science and technology, and more. There are links to news, regional climate impacts, information for students, and much more.
http://www.epa.gov/climatechange/

Climate Change
Will Steger Foundation's K-12 interdisciplinary climate change education program includes lesson plans that are experiential in nature, tied to national standards, and available free for download. The website offers global warming lessons, a Citizen Climate Curriculum emphasizing civic engagement, and additional resources.
http://www.willstegerfoundation.org/index.php/programs/k-12-education-program

Climate Change
The Climate Change website from the World Bank offers a view of climate change from the perspective of people in the developing world. The website reviews current projects, data sets, research papers, and more.
http://beta.worldbank.org/climatechange/

Climate Change Action Projects
Facing the Future has released the Climate Change Action Project Database, a resource with ready-to-use service-learning projects that prepare students to understand and take action on climate change.
http://www.facingthefuture.org/ServiceLearning/ClimateChangeActionProjects/tabid/350/Default.aspx

Climate Change Adaptation & Communication
Park Science is a research and resource management bulletin of the U.S. National Park Service that reports the implications of recent and ongoing natural and social science and related cultural research for park planning, management, and policy. A special issue, downloadable from the website, covers Climate Change Adaptation & Communication.
http://www.nature.nps.gov/ParkScience/

Climate Change Adaptation Roadmap
The Department of Defense is preparing to address the impacts of climate change as regards to the security of our country. Check out the introduction to the roadmap, with climate change being referred to as a "threat multiplier."
http://www.acq.osd.mil/ie/download/CCARprint.pdf

Climate Change: Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources
The U.S. Government Accountability Office (GAO) obtained experts' views on the effects of climate change on federal resources and the challenges managers face in addressing climate change effects on these resources. GAO recommends developing guidelines incorporating agencies' best practices, advising on how to address climate change effects on the resources they manage and gather the information needed to do so. Links are provided to the report, report summary, and the full downloadable report.
http://www.gao.gov/docsearch/abstract.php?rptno=GAO-07-863

Climate Change Animations
Commissioned by the Great Barrier Reef Marine Park Authority, Archipelago offers three online climate change animations: Impacts of Climate Change, What is Coral Bleaching?, and What is Climate Change?
http://www.archipelago.co.uk/articles/climate-change-animations-launched

Climate Change Articles
Taylor & Francis Online offers online access to abstracting and journals. Inspired by the Durban 2011 climate change conference, they have handpicked a selection of articles on climate change from a wide range of journals and offer access to them for free. Journals include English Studies, Polar Geography, Journal of Land Use Science, and many more. Free registration is required.
http://www.tandfonline.com/page/climate-2012

Climate Change Backpack
The New England Science Center Collaborative has developed the Climate Change Backpack®, a teaching tool containing graphs, experiments, a climate change play, an imitation ice core, lesson plans, and more. The lessons are designed to expand or contract according to the audience and available teaching time. All of the activities are downloadable.
http://www.sciencecentercollaborative.org/backpack.php

Climate Change & Biodiversity Curriculum
SPECIES (Students Predicting the Effects of Climate In Ecological Systems) is an eight to twelve-week online curriculum that focuses on climate change and climate change impacts. The curriculum fuses core science content with scientific practices and includes a species distribution modeling tool for teaching students about the effects of warming temperatures on biological communities. Check out the archived webinar, example lessons, and further information about trying out the curriculum.
http://essentialscience.umich.edu/essentialscience/home

Climate Change Booklist
Check out this booklist from the U.S. Fish and Wildlife Service's National Conservation Training Center Conservation Library, *Grades K-12: Books about Climate Change and Global Warming Selections.*
http://library.fws.gov/booklists/booklistK-12climatechange.pdf

Climate Change in the Classroom
The Educational Global Climate Model incorporates a 3-D climate model developed at NASA's Goddard Institute for Space Studies. It is free and available for high school and university desktop computers. The climate model allows teachers and students to conduct experiments identical to those scientists run on supercomputers to simulate past and future climate changes.
http://www.nasa.gov/vision/earth/everydaylife/climate_class.html

Climate Change: Connections and Solutions
Facing the Future offers the 2-week curriculum unit, *Climate Change: Connections and* Solutions, free through funding from the Hewlett-Packard Company. The unit is available for grades 6-8 and 9-12. Students are encouraged to think critically about climate change and to collaborate to devise solutions. Students learn about climate change within a systems framework, examining interconnections among environmental, social, and economic issues. Check the website for additional free or for fee curriculum.
http://www.facingthefuture.org/Curriculum/BuyFacingtheFutureCurriculum/tabid/59/Default.aspx#Curriculum%20Unit
https://www.facingthefuture.org/Curriculum/PreviewandBuyCurriculum/tabid/550/List/1/CategoryID/16/Level/a/Default.aspx#.UmbDNBCRh8k

Climate Change Course - Online
The University of California offers this free online course for the general public, examining the factors responsible for climate change, the biological and sociological consequences of such changes, and the possible engineering, economic, and legal solutions to avoid more extreme perturbations. The course includes weekly themes, daily mini-lectures, data visualizations, quizzes, exams, weekly assignments, a textbook, and readings.
http://www.climatechangecourse.org/

Climate Change Curriculum
Stanford University has developed climate change curriculum units for middle and high school students. The lesson plans include both teacher-centered and student-centered activities with lectures based on provided slideshows, teacher-led demonstrations, student-led investigations, and group analysis of data. Underlying these activities is a philosophy of learning by inquiry as well as justifying claims with evidence.
https://pangea.stanford.edu/programs/outreach/climatechange/

Climate Change Curriculum
Activities for Conceptualizing Climate and Climate Change, from Purdue University and partners, offers a digitally-based instructional program that contains data-rich case studies and visualization activities as well as a visual library, as a resource for grade 7-12 teachers and students. A central goal of this program is to explore the complex interface between science and society that forms the basis of management decisions related to climate change issues. Modules include Ecological Impacts, Current Climate Maps, Extreme Weather, and Natural Processes.
http://www.iclimate.org/ccc/

Climate Change Education eBook
Climate Change Education: A Primer for Zoos and Aquariums, explores the links between climate change science, electronic media, psychology, learning sciences, communication, and interpretation, and provides insights to zoos and aquariums and other cultural institutions. The book may be downloaded from the website for free.
http://clizen.org/e-book.html

Climate Change Education Resources for the Coasts
The National Climate Assessment Coast Report highlights five key messages for climate change impact on the coast. Climate.gov offers links to educational resources addressing these issues.
http://www.climate.gov/teaching/coasts-region

Climate Change and Energy Curricula
This interdisciplinary global warming curriculum from the Will Steger Foundation helps students in grades 3-12 master background information on global climate change processes, the Arctic's importance to global climate, and the potential effects of global warming in the Arctic.
http://www.climategen.org/what-we-do/education/climate-change-and-energy-cirricula/

Climate Change: Evidence & Causes
The U.S. National Academy of Sciences and The Royal Society offer the downloadable publication, Climate Change: Evidence & Causes, a brief reference document for decision makers, policy makers, educators, and others seeking authoritative information

on questions regarding climate change. An introductory webcast will be archived on the website soon.
http://nas-sites.org/americasclimatechoices/events/a-discussion-on-climate-change-evidence-and-causes/
http://www.nap.edu/catalog.php?record_id=18730

Climate Change: Fitting the Pieces Together
The Meteorology Education and Training website provides a wide range of resources pertaining to climate change. The Climate Change module discusses climate change, particularly as it is currently being affected by increasing concentrations of greenhouse gases emitted by human activities. It also covers signs of climate change, how scientists study climate, the current thinking on future changes, and what can be done to minimize the effects. Free registration is required.
http://www.meted.ucar.edu/broadcastmet/climate/

Climate Change Forum
The Frontlines Forum seeks community-based experiences with climate change: impacts, opportunities and adaptation strategies. It provides a platform for sharing observations, concerns, and innovations. They invite contributions from indigenous or rural communities in small islands, high altitudes, the Arctic, desert margins, and other vulnerable environments.
http://www.climatefrontlines.org/

Climate Change Indicators
The U.S. Global Change Research Program has released a pilot set of 14 climate change indicators that unites efforts from across its member agencies. These indicators visually communicate aspects and effects of the changing climate, including: atmospheric carbon dioxide, ocean chlorophyll concentrations, and global surface temperatures. Some of the indicators show climate-related trends over time, whereas others show the status of resources that may be affected by future climate change.
http://www.globalchange.gov/browse/indicators

Climate Change Indicators in the United States
The EPA has released the latest edition of their report, Climate Change Indicators in the United States. The report pulls together observed data on key environmental measures, including U.S. and global temperature and precipitation, ocean heat and acidity, sea level, length of growing season, and more. The report includes more than 80 maps and graphs showing long-term trends. The website links to previous reports, a slide show, summaries, and more.
http://www.epa.gov/climatechange/science/indicators/index.html

Climate of Change: Interactions and Feedbacks between Water, Air, and Ice
In this module from Carleton College's InTeGrate program, students explore differences between climate change and climate variability, examine the ENSO system as a pattern in time and space, and examine glacial climate records as part of a role-playing game. The goal of the module is for students to understand the climate system as a set of interacting components complicated by feedbacks, uncertainties, and human decisions.
http://serc.carleton.edu/integrate/teaching_materials/climate_change/index.html

Climate Change From Pole to Pole: Biology Investigations
NSTA offers the text, *Climate Change From Pole to Pole: Biology Investigations*, with case studies and background information on how to teach the science of climate change. The six researched and field-tested activities building on four content chapters, provide students the opportunity to solve real-life scientific problems using guiding questions, graphs and data tables, short reading assignments, and independent research.
http://www.nsta.org/store/product_detail.aspx?id=10.2505/9781933531236&lid=exp

Climate Change Games
Red Redemption Ltd., based in Oxford, England, is an environmental games company producing scientific, educational, and environmental games. The website hosts online games, including Climate Challenge (for older students) and Operation Climate Control (for younger students).
http://red-redemption.com/news/

Climate Change and Human Health
NEEF has created a climate change webpage for health professionals which offers an overview of the potential health effects as well as a list of additional resources. In addition, two new online courses developed by NEEF and the Cooperative Program on Operational Meteorology Education and Training are included among the resources. Both courses are offered at no cost; free registration is required.
http://www.neefusa.org/health/cc_initiative.htm

Climate Change Impacts in the Caribbean
A new report, *An Overview of Modelling Climate Change Impacts in the Caribbean Region with Contribution from the Pacific Islands*, highlights the impacts of climate change on Caribbean nations and natural resources. The report focuses on sea level rise projections and implications, ocean acidification impacts on Caribbean coral reefs, and water resources and agriculture in the Caribbean, and offers additional analysis for the Pacific Islands.
http://www.caribsave.org/index.php?id=5

Climate Change Indicators
The third edition of EPA's Climate Change Indicators in the United States presents 30 indicators, each describing trends related to the causes and effects of climate change. It focuses primarily on the United States, but in some cases global trends are presented to provide context or a basis for comparison. Sections include Understanding Greenhouse Gases, Snow and Ice, Ecosystems, and more.
http://www.epa.gov/climatechange/science/indicators/download.html

Climate Change Indicators in the United States
The Advanced Technology Environmental and Energy Center hosts this downloadable report from the EPA on climate change indicators in the United States. The report includes coverage of greenhouse gases, weather and climate, the oceans, snow and ice, and society and ecosystems. Free registration is required.
http://ateec.org/ateec-downloads/ateec-downloads/climate-change-indicators-in-the-united-states

Climate Change Interpretation Study Circles
The National Network for Ocean and Climate Change Interpretation is implementing a study circle for interpreters or communicators who focus on ocean or coastal issues. See the website for complete details.
http://support.neaq.org/site/PageNavigator/prof_devel_study_circle.html

Climate Change Kids Site
The EPA's Climate Change Kids Site looks at climate change -- what it is, why it matters, and what kids can do about it. The website offers games, animations, quizzes, and more.
http://epa.gov/climatechange/kids/

Climate Change Lesson Plans
The International Environmental Change Workshop Series is a multi-year series of teacher workshops on global environmental change, co-sponsored and co-directed by the Wright Center for Innovative Science Education at Tufts University. The website offers lesson plans and activities, including A Haiku Journey, a Climate Reconstruction Lesson Plan, Glaciers, Climate, and the Landscape, and more.
http://www.tufts.edu/as/wright_center/iecws/

Climate Change: Lines of Evidence
The National Research Council has released a video series to make current climate knowledge easier to understand. The videos discuss solar influence, natural cycles, increased emissions, and greenhouse gases. The website also offers a downloadable booklet to accompany the series.
http://nas-sites.org/americasclimatechoices/summaries-and-videos-from-the-acc-series/climate-change-lines-of-evidence-videos

Climate Change Listservs
The EPA offers several listservs for various audiences that provide information on new climate changes resources and current news and strategies.
http://www.epa.gov/climatechange/news_listservs.html

Climate Change at the National Academies
Climate Change at the National Academies serves as a clearinghouse for National Academies climate change news, videos, webinars, and books. The website offers sustainability and energy information, as well as activities such as the Climate Education Roundtable.
http://nas-sites.org/americasclimatechoices/

Climate Change and the Pacific Islands
Teachers' Domain offers this collection to help students examine the impact of climate change in the Pacific Islands and the ways local communities are responding to the challenges they face. The media resources in the collection examine ecosystems on volcanic high islands and low-lying atolls and the climate-related threats to these ecosystems.
http://www.teachersdomain.org/special/pacific/

Climate Change Presentations for High Schools
The Alliance for Climate Education offers 45-60 minute interactive assembly presentations for high school students (in specific regions) to deliver science-based

multimedia presentations on climate education. The organization also offers grant and scholarship opportunities to empower students to take action.
http://www.climateeducation.org/

Climate Change Publications
Various institutions have recently published reports on the environmental and socioeconomic impacts of climate change, as well as strategies for addressing those impacts. MPA News Volume 11, No. 4 offers a brief publications list of general sources, management of ecosystems as carbon sinks, ocean acidification, adaptation to climate change impacts, sea level rise, and coral bleaching.
http://depts.washington.edu/mpanews/MPA112.htm

Climate Change Report
The International Panel on Climate Change released Part 2 of their assessment report detailing the impact that climate change is having around the world and outlining steps that can be taken to minimize those impacts. The Fifth Assessment Report provides a clear and up to date view of the current state of scientific knowledge relevant to climate change.
http://www.ipcc.ch/

Climate Change Reports
The German Federal Ministry for Economic Cooperation and Development has released the brochure, Climate action in practice, featuring seven chapters including Climate for Sustainable Development, Climate Risk Management, and more. The climate report from the World Bank is posted on the Open Knowledge Repository website as part of the Turn Down the Heat series.
https://www.dropbox.com/s/omek7sth1pjtffl/bmz_klima_EN_screen.pdf?dl=0
https://openknowledge.worldbank.org/handle/10986/20595

Climate Change Resource Center
The Climate Change Resource Center from the USDA Forest Service is a web-based resource that connects land managers and decisionmakers with useable science to address climate change in planning and application. It offers basic climate change educational resources along with tools, videos, a library with an annotated bibliography an extensive list of external links, and more. Check out the climate change science and modeling, effects on forests and grasslands, FAQs, and more.
www.fs.usda.gov/ccrc/

Climate Change Resources
Marine Ecosystems and Management, the bimonthly information service on marine ecosystem-based management from Marine Affairs Research and Education (MARE) in association with the University of Washington, has compiled a list of useful reports and websites on climate change. The reports include both general overviews and resources that focus on specific aspects such as sea level rise, ocean acidification, and more.
http://depts.washington.edu/meam/climate.htm

Climate Change Resources for the Classroom
The Teachers' Domain website offers climate change teaching resources for the classroom (5th grade and up) and includes public TV footage and student activities. Free registration is required.
http://www.teachersdomain.org/special/climchg/

Climate Change Response Strategy
The National Park Service's Climate Change Response Program provides direction for addressing the impacts of climate change in national parks. The website offers background information about climate change and climate change effects, along with links to further resources for education, research, and more.
http://www.nature.nps.gov/climatechange/index.cfm

Climate Change Role Simulations
The Program on Negotiation at Harvard's Law School offers this Teaching Materials and Publications website with a variety of Climate Change role simulations. The role play introduces participants to the challenges associated with collective efforts to address the uncertain and dynamic risks associated with climate change. Simulations focus on flooding, development, wind farms, and more.
http://www.pon.harvard.edu/shop/category/climate-change/

Climate Change Short Course
Adapting to Climate Change: A Short Course for Land Managers is now available from the USDA Forest Service, online or as a DVD. The self-paced course provides a synthesis of scientific and technical information and can help resource managers and decision-makers plan for future climate-driven uncertainties. There is also a flash version, which may be appropriate for those with fast computer connections.
http://www.fs.fed.us/ccrc/hjar/index_st.html

Climate Change Starter's Guidebook
This publication from the United Nations Environment Programme (UNEP) and the United Nations Educational, Scientific, and Cultural Organization (UNESCO) provides an introduction and overview for education planners and practitioners on the wide range of issues relating to climate change and climate change education, including causes, impacts, mitigation and adaptation strategies, as well as some broad political and economic principals.
http://www.unesco.org/new/en/media-services/single-view/news/the_climate_change_starters_guidebook/

Climate Change Stories for Children
The Professor Sneeze stories and educational materials were developed in the framework of a project of the International Polar Foundation. Stories for 5-12 year olds explain ways to save energy; 8-12 year olds learn how energy is produced by wind, sun, and water. The website also offers crafts, photos, and other materials.
http://www.contespedagogiques.be/pages/accueil_angl.html

Climate Change Teacher Resources
Windows to the Universe provides interlinked learning resources that support a variety of topics, including online content for browsing or to support an introductory online course on climate change, teacher professional development resources, classroom activities, and online interactives.
http://www.windows2universe.org/teacher_resources/climate.html

Climate-Change Town Hall
Communicating and Learning About Global Climate Change, an event for teachers, students, and others, was organized by AAAS in collaboration with the California

Science Teachers Association, the National Science Teachers Association, and the United Educators of San Francisco (representing the National Education Association and the American Federation of Teachers). Videos of the program, an Abbreviated Guide for Teaching Climate Change, and additional information, are available online.
http://www.aaas.org/news/press_room/climate_change/mtg_200702/

Climate Change TV and Responding to Climate Change
The group, Responding to Climate Change, is dedicated to raising awareness about climate change issues. Climate Change TV aims to provide a news service covering developments in climate change policy and low-carbon technological development. They offer a series of guides, including The Basics, Oceans FAQs, and more.
http://www.rtcc.org/

Climate Change UNEP Portal
Established as part of the United Nations Environment Network, this website serves as a portal for resources that deal specifically with climate change. Navigation is aided by the left-hand side of the homepage, with a Key Issues area offering a set of resources that provide introductions to the topic, along with sections on the overall environmental, social, and economic implications of climate change. Featured Resources leads to many good resources, including common questions, a student guide, and more.
http://climatechange.unep.net/index.cfm

Climate Change in the United States: Benefits of Global Action
This report summarizes results from the Climate Change Impacts and Risks Analysis (CIRA) project. This peer-reviewed report from the EPA examines how future impacts and damages of climate change across a number of sectors in the United States can be avoided or reduced with global action. The report can be downloaded in its entirety or by sections.
http://www2.epa.gov/cira/downloads-cira-report

Climate Change: A Wisconsin Activity Guide
This climate change guide from Wisconsin's Department of Natural Resources is a resource for Wisconsin's teachers (grades 7-12) to help students develop the knowledge and skills needed to become informed and active participants in society's climate change discussions. The guide touches on both the scientific aspects of climate change and social issues. It contains activities applicable to a variety of subjects including sciences, math, language arts, social studies, and art.
http://www.dnr.wi.gov/eek/teacher/climatechangeguide.htm

Climate Change, Wildlife, and Wildlands Toolkit: A Toolkit for Teachers and Interpreters
The U.S. Environmental Protection Agency, in partnership with the National Park Service and with input from the U.S. Fish and Wildlife Service, developed a kit for use when talking with the public about how climate change is affecting our nation's wildlife and public lands. The website includes downloadable introductory materials, case studies, flash cards, and more. Check out the Climate Change Home Page with links to a myriad of useful resources.
http://www.epa.gov/climatechange/wycd/ORWKit.html

Climate Change and World Heritage
The UNESCO World Heritage Centre offers the publication entitled "Case Studies on Climate Change and World Heritage". The report features 26 case studies, including the Tower of London, Kilimanjaro National Park, and the Great Barrier Reef, that are representative of the dangers faced by the 830 sites inscribed on the World Heritage List. Chapters include Glaciers, Marine Biodiversity, Archaeological Sites, and more.
http://whc.unesco.org/documents/publi_climatechange.pdf

Climate Commons
Climate Commons is an interactive map which combines NOAA data with climate impact reports. The map combines recent data on climate change indicators and emissions with geo-tagged stories on climate change.
http://climatecommons.earthjournalism.net/map/

Climate Communication
Climate Communication is a project of the Aspen Global Change Institute, a nonprofit organization dedicated to furthering the scientific understanding of Earth systems and global environmental change. The Climate Communication website aims to simplify climate questions with plain-language answers to what's happening to the climate, how it will affect us, and what people can do about it.
http://climatecommunication.org/

Climate Communications and Behavior Change Guide
The Climate Communications and Behavior Change Guide, a collaboration between the Resource Innovation Group and the University of Oregon's Institute for a Sustainable Environment, focuses on mitigation and can be downloaded from the website.
http://climlead.uoregon.edu/node/156

Climate, Community and Biodiversity Project Design Standards
The downloadable draft of the Climate, Community & Biodiversity (CCB) Project Design Standards is designed to identify proposed projects likely to deliver measurable climate, biodiversity and community benefits. The standards are primarily designed for land-use carbon markets but can also apply for sustainable development and biodiversity projects more broadly.
www.climate-standards.org
http://www.climate-standards.org/images/pdf/ccb_project_design_standards_v1.0.pdf

Climate Connections
National Public Radio (NPR) and National Geographic host the Climate Connections website with news items, interesting facts, practical ideas, and a daily podcast. An interactive map allows visitors to follow NPR reporting on areas of the world impacted by global warming, and the Wild Chronicles offers videos on a variety of wildlife and global warming issues.
http://www.npr.org/templates/story/story.php?storyId=9657621

Climate Connections: A Global Journey
National Public Radio and National Geographic host the Climate Connections website with news items, a daily podcast, and more. An interactive map allows visitors to follow NPR reporting on areas of the world impacted by global warming, and the Wild Chronicles offers videos on a variety of wildlife and global warming issues. Topics include Deep Time, Thawing Ice, and much more.

http://www.npr.org/news/specials/climate/interactive/?ps=bb3

Climate Denial Crock of the Week
The Climate Denial Crock of the Week is a video series and blog debunking climate change denial claims.
http://climatecrocks.com/

Climate Discovery Teacher's Guide
This website from the National Center for Atmospheric Research includes three units with downloadable lessons for grades 5-9 to facilitate student learning about our planet's climate system. The units review how the sun's magnetism interacts with the earth's magnetic field, how scientists study ancient climates, and understanding how the earth system works. An unit on Investigating Climate Future is expected to be available in 2007.
http://eo.ucar.edu/educators/ClimateDiscovery/

Climate Education in an Age of Media Project
The Climate Education in an Age of Media Project website contains information about how media production by students is being brought into climate change education and can be readily adopted in a wide range of instructional environments. This is a new initiative; check back often for further updates.
http://cleanet.org/cced_media/index.html

Climate Education Week
The Earth Day Network supports the Climate Education Week, April 18-25, 2015. Join the educators network for curriculum, service learning projects, and more.
http://www.earthday.org/climateeducationweek

Climate Explorations
Ohio Sea Grant and partners share climate information through the webinar series, Climate Explorations, a new informal education curriculum for 4-H. The curricula includes Great Lakes climate information and will be teacher-tested and rolled out to classrooms next year. Check out upcoming webinars in November and January.
http://bprc.osu.edu/education/blog/topics/climateexplorations/

Climate and Fisheries
NOAA Fisheries scientists are working to understand and respond to challenges presented by climate change and ocean acidification and have launched a portal site featuring articles, videos, and other resources to share information about current work on these topics.
http://www.fisheries.noaa.gov/stories/2014/03/climate_portal.html

Climate Impacts in the Great Lakes
Ohio Sea Grant's climate webinar series is available for free on iTunes. The course, Climate Impacts in the Great Lakes, features more than 40 presentations on climate research, adaptation, and education. The course provides an overview of research about how a changing climate may affect different aspects of daily life.
https://itunes.apple.com/us/course/climate-impacts-in-great-lakes/id938743188

Climate Interpreter
The Aquariums Climate Coalition has established this website to build capacity among informal science educators and interpreters for communicating about climate change to public audiences. The website features past webinars as well as links to resources related to communicating about climate change with audiences in informal settings. Be sure to check out the resources and events pages.
http://www.climateinterpreter.org/

Climate Intervention Reports
Climate intervention, also known as geoengineering, refers to deliberate, large-scale manipulation of Earth's climate intended to counteract human-caused climate change. The National Academies Press has released two reports that assess the potential impacts, benefits, and costs of two different proposed classes of climate intervention: carbon dioxide removal and reflecting sunlight.
http://nas-sites.org/americasclimatechoices/other-reports-on-climate-change/2015-2/climate-intervention-reports/

Climate Kids
NASA offers the Climate Kids: NASA's Eyes on the Earth website, targeted at kids in grades 4-6. It offers online interactives, images, video, and content, along with links to websites with educator resources.
http://climate.nasa.gov/kids/

Climate Literacy
Climate Literacy: The Essential Principles of Climate Science presents information about Earth's climate, impacts of climate change, and approaches to adaptation or mitigation. Principles in the guide can serve as discussion starters or launching points for scientific inquiry. The guide aims to promote greater climate science literacy by providing this educational framework of principles and concepts. The guide can serve educators who teach climate science as a way to meet content standards in their science curricula.
https://www.climate.gov/teaching/teaching-climate-literacy-and-energy-awareness

Climate Literacy
The Teachers' Domain website offers climate change teaching resources for the classroom, grades 3-12, based upon the Essential Principles of Climate Literacy. Note that the website has been updated with a new address.
http://www.teachersdomain.org/special/climlit/

Climate Literacy: Essential Principles and Fundamental Concepts
The Climate Literacy Network offers a climate science literacy guide to serve as a framework for understanding and communicating about climate science. Points in the guide can serve as discussion starters or launching points for scientific inquiry. The guide can also serve educators who teach climate science principles as a way to meet learning standards in their science curriculum. The website offers links to additional student and teacher resources.
http://climateliteracynow.org/

Climate Literacy Guide
The United States Global Change Research Program offers the downloadable report, *The Climate Literacy Guide: The Essential Principles of Climate Science*, an interagency guide providing a framework and essential principles for formal and informal education

about climate change. The guide presents information about climate, impacts of climate change, and approaches for adapting and mitigating change.
http://globalchange.gov/resources/educators/climate-literacy

Climate Literacy Handbook
The Climate Literacy Handbook presents the basic scientific concepts of climate science for non-technical audiences. It is an elaboration of Climate Literacy: The Essential Principles of Climate Sciences, a set of seven principles and their underlying fundamental concepts that developed by scientists and educators. Commentary and online resources follow each principle, allowing further exploration of key climate literacy concepts.
http://www.eoearth.org/article/Climate_Literacy_Handbook

Climate Matters
Climate Matters is a newsletter dedicated to disseminating information on current activities in the USGS Climate Research & Development Program. The semi-annual newsletter is intended to highlight recent research findings from the program and their relevance to societal needs and issues of interest to resource managers, policy makers, and the general public. The current issue includes articles on Studying arctic sea ice ecosystem change, Sea level rise and nutrient cycling in coastal wetlands, and more.
http://www.usgs.gov/climate_landuse/clu_rd/newsletter/default.asp

Climate Newsletter
The Climate.gov newsletter is a weekly recap of what's been added to or featured on Climate.gov in each of the major sections: News & Features, Teaching Climate, Maps & Data, and Supporting Decisions.
http://bit.ly/1uPyfZ2

Climate One Stop
Researchers attending the United Nations Climate Change Conference in Copenhagen unveiled a website dedicated to gathering and organizing climate data for decision makers, professional scientists, and others. Information search criteria include education, funding, and more. Be sure to add your program to the website.
http://arcserver4.iagt.org/climate1stop/

Climate Outlooks
NOAA's Climate Prediction Center Climate Outlooks offer users forecasts of future weather conditions relative to what's normal for their region. Part of the U.S. Climate Resilience Toolkit, users can access outlook maps showing experts' judgments regarding changes for above-, below-, or near-average temperature and precipitation, as well as potential hazards and drought conditions, with timescales ranging from weeks to years.
http://toolkit.climate.gov/tool/climate-outlooks

Climate of the Past
Climate of the Past is an interactive open access journal published under the auspices of the European Geosciences Union, dedicated to the publication and discussion of research articles, short communications, and review papers on the climate history of the Earth. In addition to general issues, they offer the possibility of publication of special issues.
http://www.clim-past.net/volumes_and_issues.html

http://www.climate-of-the-past.net/

Climate Post
The Nicholas Institute for Environmental Policy Solutions at Duke University introduces The Climate Post, a weekly narrative overview which aims to provide commentary on the news, trends, and events that shape climate policy.
http://theclimatepost.wordpress.com/

Climate Prediction Center GIS Portal
The NOAA Climate Prediction Center's Temperature, Precipitation, and GFS (Global Forecast System) Forecast products include operational predictions of climate variability, real-time global climate monitoring products, and assessments of the origins of climate anomalies.
http://www.cpc.noaa.gov/products/GIS/map_viewer/cpcgis.swf

Climate Program
NOAA's Climate Program Office education website offers links to a variety of climate change materials, including presentations; the guide from AAAS, *Communicating and Learning About Global Climate Change: An Abbreviated Guide for Teaching Climate Change*; and more.
http://climate.noaa.gov/index.jsp?pg=/education/edu_index.jsp&edu=literacy

Climate Reanalyzer
This interactive visualization is a suite of weather and climate datasets, along with tools to manipulate and display them visually.
http://cci-reanalyzer.org/

Climate and Reefs
This website will provide a one-stop source of information about the work of the partnership project, the Australia Caribbean Coral Reef Collaboration: Managing coral reefs in a changing climate, which is tackling key issues relating to climate change and coral reefs in the Caribbean. The website will include a collection of resources showcasing the information, people, and activities that are helping to improve the outlook for the reefs of the Caribbean in a changing climate.
http://climateandreefs.org/

Climate Reel
Climate Reel offers a collection of NASA's videos and visualizations of climate change. The website highlights popular videos and offers lists of videos organized by theme. Each video explores a different aspect of climate change, and encourages the viewer to explore the topic further.
http://climate.nasa.gov/ClimateReel/

Climate Resilience Toolkit
A NOAA-led partnership of U.S. federal agencies has released the U.S. Climate Resilience Toolkit to provide tools, information, and scientific expertise to help communities and businesses build resilience to climate-related impacts and extreme events.
http://toolkit.climate.gov/

Climate Science Research for Educators and Students: Earth's Radiative Balance
The Institute for Earth Science Research and Education offers this downloadable document with details about monitoring solar radiation, surface reflectance, and surface and sky thermal radiation. Chapters on sky photography and accessing online resources and climate data are also included.
http://www.instesre.org/ClimateResearchProjectsForStudents.pdf

Climate: Seas of Change
In JASON Learning's new curriculum, *Climate: Seas of Change*, students model science and engineering practices as they investigate and analyze the forces that shape and change climate. Students work alongside JASON Host Researchers as they explore the nature and importance of Earth's ocean; investigate energy flow in the Earth system; investigate the causes and impacts of climate change; and learn how scientists are working to predict Earth's climate future.
http://www.jason.org/curriculum/climate-seas-of-change

Climate Security
The Climate Security 101 project aims to answer frequently asked questions regarding the nature of climate risks to security, as well as act as a clearinghouse for the latest climate security research and policy documents.
http://climatesecurity101.org/

Climate-Smart Conservation
The guide from the National Wildlife Federation, Climate-Smart Conservation: Putting Adaptation Principles into Practice, provides natural resource managers and other decision-makers with a toolbox on how to plan and implement effective natural resource conservation in the face of rapidly changing climate conditions. The guide directly addresses the need to increase the resilience and adaptation of natural resources and the people and economies that depend on them.
http://www.nwf.org/pdf/Climate-Smart-Conservation/NWF-Climate-Smart-Conservation_5-08-14.pdf

Climate and Social Stress
The recent study by the National Academy of Sciences, Climate and Social Stress: Implications for Security Analysis, was requested by the U.S. intelligence community. The downloadable prepublication recommends a range of research and policy actions to create a whole-of-government approach to increasing understanding of complex and contingent connections between climate and security, and to inform choices about adapting to and reducing vulnerability to climate change.
http://www.nap.edu/catalog.php?record_id=14682

Climate Stabilization Targets
This report on climate change, *Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millenia*, was sponsored by the Energy Foundation and the U.S. Environmental Protection Agency. The report emphasizes the importance of 21st century choices regarding long-term climate stabilization. The report and summaries are downloadable from the website.
http://www.nap.edu/catalog.php?record_id=12877#description

Climate Stewards Education Project
The NOAA Climate Stewards Education Project provides formal and nonformal educators sustained professional development, collaborative online tools, and the support to build a climate-literate public engaged in climate stewardship. Sign up for the email list about resources and opportunities.
http://oceanservice.noaa.gov/education/climate-stewards/

Climate Time Machine
This NASA website offers a series of visualizations which show how some of the key indicators of climate change, such as temperature, sea ice extent, and carbon dioxide concentrations, have changed in Earth's recent history.
http://climate.jpl.nasa.gov/ClimateTimeMachine/climateTimeMachine.cfm

Climate Variability and Change - Online
The Climate Variability and Change Virtual Course was a five-day facilitated course in 2013, and the 13 recorded presentations are now available for free, online. The materials offer background on climate variability and change with emphasis on effective communication skills. Topics include weather vs. climate, drought, communication, and more.
https://www.meted.ucar.edu/training_module.php?id=1034.#.U4dOGigUrpU

Climate Voices
The Climate Voices network brings non-political conversations about the research findings of the majority of climate scientists to citizens across the United States and Puerto Rico. Check out the videos and websites, find a speaker, and more.
http://climatevoices.org/

Climate Wisconsin
Climate Wisconsin is a project of the Educational Communications Board with funding from the Corporation for Public Broadcasting. It offers stories and interactives about climate change, including phenology, ice cover, adaptation & migration, and more. Background essays, teaching tips, and additional resources support each video segment.
http://climatewisconsin.org/

Climate Witness
Climate Witness is an initiative by the World Wildlife Federation to document the direct experiences of people who are witnessing the impacts of climate change on their local environment. WWF is working with climate scientists through their Climate Witness Science Advisory Panel to establish if the impacts reported are consistent with known trends, and if these stories can be placed in the context of current scientific knowledge of human-induced climate change events in a particular region. Subject to time availability these scientists will give their expert opinion on submitted stories.
http://www.panda.org/about_wwf/what_we_do/climate_change/problems/people_at_risk/personal_stories/index.cfm

Climate Wizard
The Nature Conservancy's ClimateWizard lets technical and non-technical audiences access leading climate change information and visualize its impacts anywhere on Earth. Users can choose a state or country and assess how the climate there has changed over time and project what changes are predicted to occur in the future.

http://www.climatewizard.org/

Climate at Your Doorstep
The Climate at Your Doorstep project connects participants directly with leading climate change experts through social media to share information about climate change impacts that are occurring in readers' own backyards. A panel of scientists and experts specializing in climate change will directly respond to readers' questions, photos, and videos about environmental changes they may be experiencing in their own communities.
http://www.dailyclimate.org/doorstep

ClimateBiz
As a partnership between two nonprofit organizations, Business for Social Responsibility and the Green Business Network, the ClimateBiz website offers a place to learn from each other. *ClimateBiz 101* offers an overview of the interactions between the world of business and climate change, and also provides insights into how to best utilize the website. Other sections include background articles, tools and resources, Ask the Climate Expert, and more.
http://www.climatebiz.com/

ClimateChange LIVE! – Resources and Online Webinars
The U.S. Forest Service and partners offer this website to bring climate learning to you through a series of webcasts, webinars, and online climate education resources. The materials include climate education resources and programs gathered from 17 federal agency and NGO partners. The National Wildlife Federation is hosting a series of six webinars in connection with the ClimateChange LIVE! materials.
http://climatechangelive.org/

ClimateClassroom
The National Wildlife Federation's Climate Classroom is designed to help parents and teachers talk to students of differing ages about global warming. Its features include information for parents, proposed educator guidelines, age-adapted sources of useful curricula, a downloadable slide presentation with presenter's guide, and more.
http://www.ClimateClassroom.org

Climateprediction.net
Climateprediction.net is a distributed computing project that aims to produce predictions of the Earth's climate up to the year 2300 and to test the accuracy of climate models. The project needs people around the world to volunteer time on their computers when their computers are on but not being used at full capacity.
http://www.climateprediction.net/

Close Listening on NPR
For seven weeks beginning July 30, 2015, NPR's Morning Edition will be running a series of reports produced in collaboration with the Cornell Lab. Called "Close Listening: Decoding Nature Through Sound," the programs will introduce scientists who have pioneered ways to tune in to the natural chatter going on all around us.
http://www.npr.org/programs/morning-edition/

Clouds, Precipitation, and Our Earth System - Online
Join presenters for a series of free webinars about Earth system science resources for middle school and high school educators. The webinar will include an overview of global patterns of clouds and precipitation and what causes them; will describe how scientists measure rain and snow on the ground, in the clouds, and from satellites; and include how you can bring weather data into your classroom using NOVA's new Cloud Lab and NESTA's "Windows to the Universe" website.
https://www.surveymonkey.com/s/H96TNBS

Clue in to Climate Change
Climate change can be examined through a number of lenses, including both rigorous scientific inquiry and through the perspective of persons living in various areas which happen to be undergoing significant climatic transitions. This website examines climate change in the Arctic. The site includes interactive activities, first-hand narratives, and section designed to increase awareness of the rapidly changing situation in the region. Other features of the site include a glossary, three lesson plans, and an online quiz.
http://www.nature.ca/sila/

C-MORE Teacher Resources
The Center for Microbial Oceanography offers a variety of science kits with lesson plans and materials for hands-on science activities in a self-contained format, for distribution within Hawai'i. Each kit provides the information and supplies necessary for educators to teach their students about a particular topic in oceanography. The website offers the lesson plans for downloading, along with many more resources. Topics include ocean acidification, marine debris, random sampling, and more.
http://cmore.soest.hawaii.edu/education/teachers/science_kits.htm

Coalition Edition
The summer 2015 edition of Sanctuary Watch features the role of coalitions and partnerships, with case studies highlighting their importance in communication, empowerment, and more.
http://sanctuaries.noaa.gov/news/sw/sanctuary-watch-summer-2015.pdf

Coast Day - Delaware
The University of Delaware's Coast Day, October 7, 2007 October 5, 2014 in Lewes, Delaware, introduces thousands of people each year to the wonders of the sea and the importance of Delaware's marine and coastal resources. Visitors enjoy hands-on exhibits, lectures on popular science topics, and more. Kids have special opportunities to speak with marine scientists and learn firsthand about their discoveries. They can also explore the many fascinating careers available in environmental science fields.
http://www.ocean.udel.edu/coastday/
http://www.decoastday.org/

Coastal America Student Summit – Washington, D.C.
Coastal America is holding the 3rd Student Summit on the Ocean and Climate, February 14-17, 2011 in Washington, D.C. The Summit is designed to teach high school students about the interconnectedness between the ocean, Great Lakes, inland seas, and climate with particular focus on climate change, and help prepare them for future careers in ocean and climate science and policy.
http://studentsummit.wikispaces.com/

Coastal Climate Adaptation
The NOAA Coastal Services Center hosts the Coastal Climate Adaptation website, which focuses on adaptation-related resources such as local and state plans, new policies, case studies, risk and vulnerability assessments, and decision-support tools. There is a forum where users can suggest new resources, engage in dialogue on the issues, and submit comments and questions. Check out the list of tools for adaptation already on the website, along with the initial outreach and education offerings.
http://community.csc.noaa.gov/climateadaptation/

Coastal Climate Adaptation Website
NOAA's Coastal Climate Adaptation website makes it easy for coastal communities to find resources and engage in climate-related discussions. Visitors can find easy-to-understand climate change science information, examples of strategies, and plans and policies that communities can employ to address climate change impacts.
http://collaborate.csc.noaa.gov/climateadaptation/default.aspx

Coastal Conservation Network
The Coastal Conservation Network promotes awareness of water related issues by building a collaborative organization worldwide through technology, outreach, education, and advocacy. The website hosts a myriad of global environmental videos.
http://www.ccnworldwide.org/

Coastal and Estuarine Science News
The Estuarine Research Federation offers Coastal and Estuarine Science News, funded by the Ocean and Coastal Protection Division of the EPA, to strengthen the link between science and management in coastal systems. Back issues are posted at http://www.erf.org/cesn/ . You can subscribe to the mailing at http://www.erf.org/user-cgi/cesnlist.pl .

Coastal Fisheries Management and Development Project
The National Fisheries Authority of Papua New Guinea offers downloadable files from the Coastal Fisheries Management and Development Project, an initiative to promote sustainable, community-based management of coastal waters and education of communities that are often relatively isolated and home to people with varying degrees of literacy. Materials include posters, comics, and radio plays free of scientific and technical jargon.
http://www.fisheries.gov.pg/publications_coastal_fisheries_management_dev_project.htm

Coastal Geotools 2011
At the 2011 Coastal GeoTools conference, coastal professionals shared their geospatial knowledge and experience and developed new partnerships. Presentations are posted on the website.
http://geotools.csc.noaa.gov/default.aspx

Coastal Heritage
Coastal Heritage is a quarterly publication of the South Carolina Sea Grant Consortium. Each issue is accompanied by Curriculum Connection guides, which offer focus questions, links to in-depth information, educational activities and resources, and more. The latest issue is *Cold-Water Corals: Ancient life in the deep, dark sea*. You can access the latest issue along with complete archives from the website.

http://www.cosee-se.org/teacher/?join=209

Coastal Inundation Toolkit
The Coastal Inundation Toolkit is available from the Digital Coast website. The toolkit contains tools and information communities need to address coastal inundation issues. An inundation mapping guidebook is the main component of the toolkit, with instructions that show communities how to discover and map the areas likely to flood and the features which are most at risk. The site also provides information about coastal inundation, how to best communicate risk information, and more. Check out the Visualize section with Picture It, Graph It, and Build It.
http://www.csc.noaa.gov/digitalcoast/inundation/

Coastal Kingdom
The TV series, Coastal Kingdom, focuses on the diverse habitats found in the South Carolina lowcountry. Current episodes include Sharks and Rays, The Salt Marsh, and more. You can view them on the website if you don't live in an area that broadcasts them on television. Check out the additional resources on the website, include a field guide.
http://www.coastalkingdom.com/

Coastal Land Cover and Change Maps
Coastal land cover and change maps, circa 1996-2001, are available for the conterminous U.S. from NOAA's Coastal Services Center. In addition, land cover updates for 2006 and their corresponding change maps are available for the Gulf Coast region and parts of the Northeast.
http://www.csc.noaa.gov/crs/lca/locateftp.html

Coastal Louisiana Activity Book
NOAA's National Centers for Coastal Ocean Science (NCCOS) offers the Coastal Louisiana Activity Book, the sixth in a regional series of children's activity books. The book introduces children (grades K-5) to coastal animals and ecology through regional information, fun facts, drawings to color, games, matching, and more. This series' goal is to begin the process of forming an environmentally aware citizen population, and encourage future careers in marine sciences.
http://www.coastalscience.noaa.gov/education/welcome.html

Coastal and Marine Ecological Classification Standard
The Coastal and Marine Ecological Classification Standard provides a comprehensive national framework for organizing information about coasts and oceans and their living systems. This information includes the physical, biological, and chemical data that are collectively used to define coastal and marine ecosystems. This allows local, state, federal, and international entities to make comparisons among data collected from different sources and in different locations.
http://www.csc.noaa.gov/digitalcoast/publications/cmecs

Coastal and Marine Geology Program
The USGS Coastal and Marine Geology Program website offers overviews of a range of topics from El Nino to sea-level change, pollution to corals, and more. The drop down Content Type menu includes Educational Materials. It may take a bit of searching to find exactly what you need, but it can be worthwhile. One link took me to the USGS Coastal

and Marine Knowledge Bank, an initiative to develop and present an interdisciplinary scientific framework for marine environments, the coastal zone, and coastal watersheds.
http://marine.usgs.gov/index.php

Coastal and Marine Geology Video and Photograph Portal
The U.S. Geological Survey portal offers video and photography of the seafloor off of coastal California and Massachusetts, and aerial imagery of the coastline along segments of the Gulf of Mexico and mid-Atlantic coasts. Check out the tutorial for ease of exploration.
http://cmgvideo.usgsportals.net/

Coastal Ocean Observing Center
The Coastal Ocean Observing Center at the University of New Hampshire monitors the linked oceanic and estuarine ecosystem in their region. This monitoring system can detect changes in the ecosystem across multiple physical and trophic levels. The web-site includes data, educational materials, news, upcoming workshops, and more. Lesson plans and activities can help you integrate ocean observing data and tools into your classroom, and includes an image viewer and analysis tool for satellite images.
http://www.cooa.unh.edu/index.jsp

Coastal Ocean Science Blog
NOAA's National Centers for Coastal Ocean Science (NCCOS) hosts the Coastal Ocean Science Blog, offering a 360-perspective of research and how that science is being used by natural resource managers and partners around the U.S. and its Territories.
http://noaaoceanscience.wordpress.com/

Climate in the Parks
The Institute at the Golden Gate's publication, *Climate in the Parks: Innovative Climate Change Education in Parks,* highlights how the National Park Service and other park agencies in the U.S. and around the world are taking action on climate change through planning mitigation strategies and adaptation responses to local environmental changes, and how educators and interpreters are using this as an opportunity to engage the public on this critical issue.
http://ggnpc.convio.net/site/MessageViewer?dlv_id=46161&em_id=22901.0

Coastal Planning Advisor
The NOAA Coastal Services Center's Coastal Planning Advisor is an online tool that helps users ask the right questions during planning for different coastal management issues, ranging from climate change to wetland restoration. The questions can be customized to users' situations and can be shared online through an easy link. The tool also includes case studies, NOAA resources available for each issue, and more.
http://csc.noaa.gov/digitalcoast/training/coastalplanningadvisor/

Coastal Population Trends
NOAA's National Ocean Service's Special Projects office has published *Population Trends Along the Coastal United States: 1980-2008*. This report contains useful statistics and highlights the importance of coastal areas. It presents an overview of coastal population trends from 1980 to 2003 and projected change in coastal population by 2008.
http://oceanservice.noaa.gov

Coastal Research and Education Society of Long Island
This organization includes experts in marine mammal and environmental science, education, and conservation who conduct research; provide educational experiences; and promote conservation of coastal ecosystems in Long Island, New York. The website offers introductory material on whales, pinnipeds, seabirds, and more; a local species checklist; and multimedia.
http://www.cresli.org/

Coastal Resilience
The Nature Conservancy and partners have revamped their Coastal Resilience website with decision-making tools for coastal risk assessment. The website offers an interactive suite of tools, available in the Geographies section, which allows you to examine storm surge, sea level rise, and more; develop risk reduction and restoration solutions; and more.
http://www.coastalresilience.org/

Coastal Resource Management Customer Trends Survey
NOAA's Coastal Services Center provides technology, information, and management strategies needed to address complex coastal issues. The center sponsors a survey every three years to gather information to better understand the issues affecting the coastal management community. The latest survey offers an overview of the issues, needs, and priorities of coastal managers, while providing a resource to understand how managers are using data and tools.
http://www.csc.noaa.gov/survey/

Coastal Roots
Coastal Roots: Seedling Nursery Program for Wetland Restoration is a program of the Louisiana State University. Students from 4th grade through high school in south Louisiana are taking part in this project by establishing wetland plant nurseries at their schools. Students grow native plant seedlings that they will plant in a coastal habitat restoration project in south Louisiana.
http://coastalroots.lsu.edu/

Coastal Storm Impacts
The NOAA Ocean Service is working with the Weather Channel on a 30-minute show on the impacts of coastal storms on communities and some of the tools/capabilities that are available to help them. The key issues the show will address include ways that the public can be better informed about coastal storms.
keelin.kuipers@noaa.gov

Coastal Storms
The Bridge features a series of over 65 DATAs that can be used to supplement curriculum material in almost every discipline of science. The DATA *Satellites and Storms* utilizes satellite and ship-reported data to investigate the similarities and differences between hurricanes and northeasters. Students will explore how these storms form, how to locate them on weather maps, and their effects on other seemingly unrelated systems.
http://www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive1007.html

Coastal Socioeconomics
The Management and Budget Special Projects Office launched a new website highlighting spatial trends in coastal socioeconomics. The site offers time series, geo-referenced data from the U.S. Census Bureau and the Bureau of Economic Analysis, and web based tools to facilitate data analysis. The primary objective of the site is to increase awareness and improve access for the coastal stewardship community to socioeconomic information.
http://stics.noaa.gov

The Coastal Union
EUCC - The Coastal Union is an association with members and member organizations in 40 countries. Founded in 1989 with the aim of promoting coastal conservation by bridging the gap between scientists, environmentalists, site managers, planners and policy makers, it has grown since then into the largest network of coastal practitioners and experts in Europe. Their website includes information about dune management, coastal landscapes and typology, the European Code of Conduct for Coastal Zones, and more. All issues of the EUCC Coastal News can now be accessed from a link on the front page of the website.
http://www.coastalguide.org

Coastal and Waterfront Smart Growth
NOAA, the EPA, and other agencies have released a smart growth guide that will help coastal and waterfront communities tackle threats from sea level rise, stronger hurricanes, flooding, and other challenges. *Smart Growth for Coastal and Waterfront Communities* features ten smart growth guidelines for development along the water. The publication and website highlights tools, techniques, and examples of smart growth in practice.
http://coastalsmartgrowth.noaa.gov/

Coastal Wildlife – Feeling the Squeeze
University College in Chichester, England hosted a video conference on October 1, 2003, with presentations on climate change, coastal habitats and coastal defense, a field visit, and workshop sessions.
http://www.excitingscience.com/pages/924510/

Coastcolour Project
The European Space Agency has launched the Coastcolour project to fully exploit the potential of the MERIS instrument for remote sensing of the coastal zone. All data will be made online available from the website. Coastcolour is developing, demonstrating, validating, and comparing different algorithms over a global range of coastal water types, identifying best practices, and promoting discussion of the results in an open, public form.
http://www.coastcolour.org/

CoastLines
CoastLines, funded by the National Science Foundation, will introduce fundamental concepts about information technologies to grade 7-12 schools through geographic information systems (GIS) and global positioning systems (GPS), by conducting scientific studies of coastal ecosystems in the Long-Term Ecological Research network.
http://www.coastlines.ws/

Coastwatching by Computer: Water Quality and the System-Wide Monitoring Program (SWMP)
The NERR System-wide Monitoring Program tracks short-term variability and long-term changes in estuarine waters to understand how human activities and natural events can change ecosystems. It provides long-term data on water quality and weather at frequent time intervals. There are lesson plans giving step-by-step instructions for accessing and downloading the data and a graphing exercise to help use the data in your classroom.
http://www.nerrs.noaa.gov/Monitoring/welcome.html .
http://www.waquoitbayreserve.org/education.htm#lp .

COASTWEEKS - California
COASTWEEKS, September 15-October 7, 2007, is a celebration of coastal and water resources. In California, COASTWEEKS is coordinated by the California Coastal Commission. The Commission will feature the events of participating organizations in a special section of their website; submit your event by July 27, 2007.
http://www.coastal.ca.gov/publiced/coastweeks/coastweeks.html

Coastweeks
Coastweeks, September 20-October 11, 2008, is a celebration of coastal and water resources. Each fall, people all over the United States participate in a three-week celebration of our coastal resources that begins on the third Saturday in September. The kick off for the celebration is Coastal Cleanup Day, when tens of thousands of people across the country come together o keep our coasts and inland waterways free of debris. Search the web to found out what's happening around your area.

Coastweeks
Coastweeks, September 19-October 11, 2009, is a celebration of coastal and water resources. Each fall, people participate in a three-week celebration of our coastal resources that begins on the third Saturday in September. The kick off for the celebration is Coastal Cleanup Day, when tens of thousands of people across the country come together o keep our coasts and inland waterways free of debris. Check out California's website.
http://www.coastal.ca.gov/publiced/coastweeks/coastweeks.html

Cold-Water Coral Database
The US Geological Survey's Coastal and Marine Science Center has released a report and accompanying database of deep-sea coral observations for the Western North Atlantic and the Gulf of Mexico: *USGS Cold-Water Coral Geographic Database - Gulf of Mexico and the Western North Atlantic, Version 1.0.* The database is also available through the website and contains over 1600 geospatial records with complete citations.
http://pubs.usgs.gov/of/2008/1351/title_page.html

Cold-Water Coral Reefs
This report by the United Nations Environment Program World Conservation Monitoring Center (UNEP-WCMC) examines the biology, ecology, distribution, and conservation of cold-water coral reefs. Far less known than the coral reefs in warm, shallow waters of the tropics and subtropics, these cold-water reefs are found throughout the world's seas: in fjords, along the edge of the continental shelf, and around offshore submarine banks and seamounts.
http://www.ourplanet.com/wcmc/pdfs/Cold-waterCoralReefs.pdf .

Cold Water Corals
The International Coral Reef Initiative website has created a new discussion area, Cold-water coral ad-hoc committee, on the ICRIForum. You can access this new area directly at http://www.icriforum.org/router.cfm?show=List/Postings.cfm?CONFID=80 . In addition, the ICRI website links to two cold-water coral publications and provides additional useful links.
http://www.icriforum.org/ .

Collection of Ocean Acidification Educational Resources
The Suquamish Tribe and partners offer this curated collection of free resources on ocean acidification for K-12 educators. The links include lesson plans correlated to components of the NGSS, along with links to supplemental materials such as multi-media, journal articles, and more. The website also offers an Ask an Expert submission form. Additional resources are under review; contact Paul Williams if you would be interested in joining the review process.
http://www.oacurriculumcollection.org/
Contact Paul Williams at pwilliams@suquamish.nsn.us

Colossal
Not marine education, but perfect for a stormy summer day when you can't get outside: Colossal is a blog that explores art and other aspects of visual culture. Many features explore the intersection of art and science as well as the beauty of the natural world. Every week the blog provides 15-25 new posts, videos, photographs, and art installations. You can look through the archives at random, or by topics including animals, nature, stop motion, and more. Check this out when you have lots of free time to spend here.
http://www.thisiscolossal.com/

The Columbia River Virtual Field Trip
Learn about the Columbia River Watershed, including its history, geology, the headwaters region, First Nations and Native Americans culture, current issues and challenges to the river. Make educational connections and provide glimpses of sustainability about the future of the river with readings on the river from multiple perspectives. The materials are designed for middle and high school students and teachers.
http://cbi.wsu.edu .

Columbia University Lesson Plans
Each summer, Columbia University's Summer Research Program participants develop lesson plans. Most are research-inspired and reference science standards. Categories include Earth Science, Environmental Science, and more.
http://scienceteacherprogram.org/lesson.htm

Comic Book Super Powers in Real Life – Southern Fried Science
Check out this Southern Fried Science article about five organisms with real super powers that rival their comic book counterparts. And while there, check out the rest of the website, a marine science, environmental science, and conservation blog by a team of scientists who love the ocean, science, conservation, philosophy, education, and outreach.
http://www.southernfriedscience.com/?p=14057

Common Freshwater Invertebrates of North America
McDonald & Woodward Publishing offers four new interactive educational resources for use in identifying and studying common, widespread freshwater invertebrates of North America, based upon the book, *A Guide to Common Freshwater Invertebrates of North America.* The resources include Flash Cards of Common Freshwater Invertebrates of North America and QuickGuide to Major Groups of Freshwater Invertebrates, an easy-to-use guide to identifying common, widespread macroinvertebrates.
http://www.mwpubco.com/environmentaleducation.htm

A Common Language of Ocean Uses
The MPA Center has developed a Common Language of Ocean Uses that provides practical, intuitive, and regionally flexible definitions of a wide range of typical human uses. The Common Language organizes 35 distinct Use Categories into four familiar Sectors to help planners, managers, and stakeholders map and understand the drivers, impacts, and benefits of ocean uses across multiple scales.
http://www.mpa.gov/pdf/helpful-resources/common_language_ocean_uses_february2013_final.pdf

Communicating Climate Change
Solution Generation and ecoAmerica aim to catalyze higher education leadership on climate change by empowering college and university leaders to lead by example and engage others in climate solutions. The website provides a range of communication tools, resources, and more to design and implement strategies to inspire and empower students, faculty, and others. Check out the Communicating on Climate guide, links to resources for energy performance improvement, and more.
http://solutiongeneration.org/

Communicating Climate Change
The Association of Science-Technology Center's Communicating Climate Change (C3) project supports partnerships between science centers and scientific research institutions to talk about climate change at 12 locations across the United States. Science centers facilitate citizen science projects to investigate locally meaningful indicators of climate change. Projects include researching sea turtles, frogs, plant phenology, and more.
http://www.birds.cornell.edu/citscitoolkit/projects/c3/c3

Communicating on Climate Change
The Metcalf Institute for Marine & Environmental Reporting has published a book summarizing the discussions and recommendations that arose from a series of workshops on the communication of climate change. *Communicating on Climate Change: An Essential Resource for Journalists, Scientists, and Educators* is a final report of the science communication workshops. The report is downloadable from the website.
http://www.metcalfinstitute.org/Communicating_ClimateChange.htm

Communicating Climate Change
The Association of Science-Technology Center's Communicating Climate Change (C3) project supports partnerships between science centers and scientific research institutions to talk about climate change at 12 locations across the United States. Science centers facilitate citizen science projects to investigate locally meaningful

indicators of climate change. Projects include researching sea turtles, frogs, plant phenology, and more.
http://www.birds.cornell.edu/citscitoolkit/projects/c3/c3

Communicating Conservation
The Ocean Project advances ocean conservation in partnership with zoos, aquariums, and museums. Resources on the website include market surveys, communications strategies, links to useful websites categorized by topic, and much more. Check out The Ocean Planet blog for regular updates about their resources.
http://theoceanproject.org/

Communicating for Conservation
The toolkit, *Communicating for conservation: a communication toolkit for Caribbean civil society organisations working in biodiversity conservation*, was developed to provide civil society organizations involved in biodiversity conservation with a guide that will help them to develop a strategic approach to building the critical knowledge, attitudes, and behaviors of the public and policymakers, as they take action to respond to these challenges.
http://www.eldis.org/go/display&type=Document&id=63121#.UQk7R2cUqTk

Communicating Ocean Sciences
Check out this new online resource for scientists and educators committed to improving their knowledge about and ability to communicate science with the public. Information includes professional development opportunities, discussion groups, resources, and much more.
http://cos-rop.net/

Communicating with Policy Makers
The Union of Concerned Scientists has archived trainings available on YouTube, including one on Tips and Tricks for Communicating with Policy Makers. This webinar offers advice to scientists and other technical experts on best practices and pitfalls to avoid when engaging with policy makers on important issues. Additional advice is available from Academy Health, the FAO, and others.
http://openchannels.org/videos/tips-and-tricks-communicating-policy-makers
http://www.academyhealth.org/files/phsr/CommunicatingWithPolicymakers.pdf
http://www.fao.org/docrep/014/i2195e/i2195e00.htm

Communicating Science
Two resources: The March 8, 2015 edition of the Marine Ecosystems and Management (MEAM, vol. 8, No. 3) offers a discussion about "Turning science into policy: What scientists should (and should not) do when talking to policy-makers." Examples are offered from different circumstances. David Shiffman from Southern Fried Science has written a blog post on how to write and publish a scientific paper in marine ecology and conservation.
http://depts.washington.edu/meam/issues.html
http://www.southernfriedscience.com/?p=18236

Communicating for Success
Communicating for Success – a handbook for MPAs from NOAA and the IUCN outlines how to use communication as more than a tool for outreach, rather as a way to catalyze

change within communities. The guide will be periodically updated to include new examples of ways ocean managers are communicating and engaging with the public.
http://cectalksnature.org/members-in-action-articles/communicating-for-success-a-handbook-for-mpa

Communication Lessons
Here are four lessons about climate change outreach learned through the experience of #DrownYourTown. These lessons can be generally useful for communicating science to mass audiences.
http://www.southernfriedscience.com/?p=16583

Communication Toolkit
A new Communication, Education and Public Awareness toolkit has been developed by the IUCN Commission on Education and Communication. Though aimed at professionals charged with implementing National Biodiversity Strategy and Action Plans, the toolkit offers practical steps that can be used to develop a variety of communication strategies. Tthere is a checklist for organizing an information meeting, a variety of tracking methods, a communication planning checklist, and much more.
http://www.cepatoolkit.org/

Communications Primer
Strategic communications helps create an effective strategy and involves identifying your goals and who you need to enlist to accomplish those goals; learning their motivations and creating a compelling message based on those motivations; and, of course, getting your message to them. The *Communications Primer for Great Lakes Habitat Advocates* is designed for grassroots organizers dedicated to enhancing public education and out-reach efforts. The website has sample press materials, evaluation pointers and more.
http://glhabitat.org/GL_Toolbox_v1/Leave_Alone/primerintro.html

Communications Tactics for Climate Change
Futerra Sustainability Communications Ltd. created this publication, New Rules: New Game – Communications tactics for climate change, as a communications guide to help in delivering the message of behavior change to impact climate change. The publication offers simple and practical communication techniques to help pull together the most effective strategies for motivating behavior change.
http://www.futerra.co.uk/downloads/NewRules:NewGame.pdf

Community Based Adaptation Field Activities
The Center for Sustainable Development offers this website with a compilation of Community Based Adaptation Field Activities, complete with links to source materials and technical information, compiled from case studies and from projects developed by field partners and online students. Topics include energy, climate change, emergency preparedness and disaster risk reduction, and more. There are extensive links to additional websites.
http://www.csd-i.org/101-hands-on-cba-field-activit

Community Collaborative Rain, Hail, and Snow Network
CoCoRaHS is a grassroots volunteer network of backyard weather observers of all ages and backgrounds working together to measure and map precipitation (rain, hail, and snow) in their local communities. By using low-cost measurement tools, stressing training and education, and utilizing an interactive website, the aim is to provide the

highest quality data for natural resource, education, and research applications. The site also includes links to lesson plans and additional educational websites.
http://www.cocorahs.org/

Community Culture and the Environment: Guide to Understanding a Sense of Place
This publication from the EPA addresses the social and cultural aspects of community-based environmental protection. The guide offers a process for defining and understanding the human dimension of an environmental issue and provides tools for more effectively working with the public on environmental protection efforts. The guide is based on the elements of social science theory and methodology most relevant to defining and understanding community life as it relates to environmental issues.
http://www.contextsensitivesolutions.org/content/reading/epa_community/

A Community on Ecosystem Services
The conference, A Community on Ecosystem Services, highlighted the broad interdisciplinary nature of research and applications of ecosystem services and the need to combine ecological, geographic, social, economic, and institutional information and models for resource management, conservation, restoration, and development decisions. The website offers downloadable abstracts and will post videos from the plenary sessions and some of the concurrent sessions.
http://www.conference.ifas.ufl.edu/aces/

Community Education Programs - Florida
The Guana Tolomato Matanzas National Estuarine Research Reserve offers a variety of free weekly Community Education Programs. Check out the EcoGeek Series, Outdoor Adventures, and more.
http://www.gtmnerr.org/events.htm

Community EE
This website has been set up to support Community EE, the process of intentional relationship development with communities with the goal of environmental awareness and action through the lens of community health and neighborhood wellness. They seek feedback on the website to help develop a listing of best practices, needs, and resources for building sustainable relationships with communities. The third draft of the Community EE Guidelines is also available for review and comment.
http://communityee.net/

Community Risk Assessment Toolkit
The Community Risk Assessment Toolkit is part of the Community Risk Assessment and Action Planning project, which aims at strengthening community level risk assessment practices. The toolkit contains resources and a compendium of case studies.
http://www.proventionconsortium.org/CRA_toolkit.htm

Community Tool Box
The National Park Service Rivers, Trails and Conservation Assistance program is always exploring new ways to help communities work together to improve their special places. They offer methods learned in a ToolBox for public participation. These include decision making support, organization, events, outreach, and much more. In addition, check out the online resources for open space conservation and other useful links at the National Center For Recreation & Conservation (NCRC) website.

http://www.nps.gov/phso/rtcatoolbox/index.htm
http://www.nps.gov/ncrc/programs/rtca/helpfultools/ht_publications.html#river

Compare the Poles
This interactive from Teachers Domain explores the differences between the North and South Poles - physical features, weather, plants, wildlife, and human impact of the Arctic and the Antarctic. Free registration is required.
http://www.teachersdomain.org/resource/ipy07.sci.life.eco.comparepoles/

Comparing Oceans
This website from NASA's Learning from Satellites features a variety of classroom activities and lessons that compare the world's oceans. Activities include The Gulf of Maine, Satellite Comparisons, Design a Fish, Ocean Soundings, and more. Space Available offers information for teachers on how satellites work.
http://octopus.gma.org/surfing/ocean/index.html

Complete Hawaiian Reef Fish Coloring Book
The Complete Hawaiian Reef Fish Coloring Book complements any marine science, biological science, or other classes that covers topics on local ecosystems. The table of contents and about 30% of the book is viewable on Google books. Check this out.
http://books.google.com/books?id=B0c6dn2w540C&printsec=frontcover

Computers for Learning
The U.S. General Services Administration sponsors the Computers for Learning website. Executive Order 12999 encourages agencies to transfer unneeded computers and related peripheral equipment directly to schools and some educational nonprofit organizations. The program specifically matches the computer needs of schools and educational nonprofit organization with excess equipment in Federal agencies.
http://computersforlearning.gov/

Conch Reef Expedition
This 5-day expedition to map the coral reefs around the Aquarius underwater habitat took place in August, 2009. Using autonomous underwater vehicles (AUVs), the science team used side-scan sonar and underwater video to determine the biodiversity of the coral reefs around the habitat, as well as what species live there. The expedition website features daily blog entries, video, pictures and suggested lesson plans and other education resources. In addition, there are two webinars archived on ustream.
http://www.vims.edu/blogs/conch_reef/index.php
http://www.ustream.tv/channel/conchreef2009

Connect a Million Minds
Time Warner Cable's Connect a Million Minds is a five-year program designed to inspire students to pursue learning opportunities and careers in science, technology, engineering, and math. The program introduces youth to opportunities and resources that inspire them to develop the important skills they need to solve economic, environmental, and community challenges of the future. Check out the partnership with NC Aquarium at Fort Fisher.
http://www.connectamillionminds.com/
http://www.ncaquariums.com/wilmington-students-get-hands-on-aquarium-operations-experience

ConnectED
Esri, the market leader in Geographic Information Systems technology, has announced a commitment in support of President Obama's ConnectED Initiative. Esri will provide free access to ArcGIS Online to all elementary and secondary schools in the United States. Under this pledge, schools will receive the same advanced mapping software used by government and business, at no charge.
http://connected.esri.com/#

Connecticut Sea Grant Educational Materials
Connecticut Sea Grant offers a variety of free educational materials about Long Island Sound, including The Living Treasures, Long Island Sound Curricular Resources Guide Connecticut River Tidal Marshes CD-Rom, and more. Some materials are downloadable from the website, while others are available for nominal charge.
http://web2.uconn.edu/seagrant/publications/marineed/index.php

Connecting the Global Oceans to Inland Audiences
The focus of Exploring Connections between the Global Oceans and the Inland Southwest is to illustrate the importance of the ocean to regional weather and climate, as well as to explore how inland populations affect the global oceans. The lectures are archived on the website, and teachers can request a CD with lesson plans. Topics include Global Patterns of Scientific Data, Water and Populations Patterns, and more.
http://cires.colorado.edu/education/outreach/cosee/

Connectivity Handbook
Preserving Reef Connectivity - A Handbook for Marine Protected Area Managers is a product of the Coral Reef Targeted Research and Capacity Building for Management Program by the University of Queensland. The downloadable handbook offers a practical guide for reef managers and others interested in the science of coral reef connectivity. Contents include: What is connectivity, What process cause connectivity, The science of connectivity, and more.
http://www.gefcoral.org/LinkClick.aspx?fileticket=wUelZOi-9QI%3d&tabid=3260

Conservation in Action
ARKive has launched a new campaign, Conservation in Action: 10 species on the road to recovery, to celebrate ARKive's 10th anniversary and highlight ten very different species to be ambassadors for conservation. Each species has been put on the road to recovery thanks to targeted conservation efforts, and all are expected to improve in status over the next ten years should this work continue.
http://www.arkive.org/conservation-in-action/#conservation-in-action

Conservation Biology for All
In support of the International Year for Biodiversity, Oxford University Press has made the following Conservation Biology textbook freely available. Chapters include biodiversity, ecosystem functions and services, invasive species, climate change, and much more. Chapters include additional suggested readings, relevant websites, and more. The file of the 358 page book is 6.4MB and downloads fairly quickly, however, for those with slower download speeds, you can download individual chapters.
http://www.mongabay.com/conservation-biology-for-all.html

Conservation Biology Articles
In honor of the International Year of Biodiversity, *Conservation Biology* has compiled and published three virtual issues of previously published articles focusing on Conservation Social Science, Connectivity and Corridors, and Climate Change.
http://www.wiley.com/bw/vi.asp?ref=0888-8892&site=1

Conservation Connect
Conservation Connect is a web-based video series that aims to connect middle school students with the outdoors and conservation careers. Produced by the U.S. Fish & Wildlife Service, each episode will help students learn about wildlife, careers, and new technologies used to study and protect wildlife.
http://www.fws.gov/letsgooutside/educators.html

Conservation Connection
The Conservation Connection is a winter-spring 2011 digital coral reef conservation experience for middle and high school students to promote the stewardship of both Fijian coral reefs and local ecosystems, through direct involvement in the scientific process. High school teens from Fiji and Chicago's west side will form the core of this program and act as peer mentors to all participants, as will coral reef experts from the museum and Fiji. Participate in as many activities and challenges on FijiReef as schedules allow.
http://www.fieldmuseum.org/calendarsystem/exhibit_item.asp?ID=72
http://synthesis.eol.org/sites/default/files/EOL_Conservation_Connection_Activity_Guide.pdf

Conservation Databases
The World Conservation Monitoring Center (UNEP-WCMC) maintains a large and varied collection of databases concerning nature conservation, developed in collaboration with a range of partners. These include species information, protected areas, forest information service, marine statistics and maps, national biodiversity profiles, and a resource center of formally and informally published information on biodiversity, held at the centre.
http://www.unep-wcmc.org/index.html?http://www.unep-wcmc.org/cis/~main

Conservation Education Materials
The Association of Fish and Wildlife Agencies has released six new publications in its North American Conservation Education Strategy Tool Kit for Achieving Excellence. The new publications include Fostering Outdoor Observation Skills, Schoolyard Biodiversity Investigations Educator Guide, and more. These and other publications, including an overview of resources, are available for free download.
http://www.fishwildlife.org/index.php?section=conservation_education&activator=25

Conservation Education Toolkit
The Conservation Education Toolkit from the Association of Fish and Wildlife Agencies offers links to publications that help K-12 teachers connect conservation education programs to science and social studies standards. Resources include Benchmarks for Conservation Literacy, Outdoor Skills Education Handbook, and much more.
http://jjcdev.com/~fishwild/?section=conservation_education_toolkit

Conservation and Environmental Education Connections
The Conservation and Environmental Education Connections listserv is a tool from the U.S. Fish & Wildlife Service for listserve moderators from federal and state agencies and

nongovernmental organizations to share professional development opportunities with conservation and EE professionals.
https://www.fws.gov/lists/listinfo/ceec

Conservation International: Biodiversity Hotspots
The Biodiversity Hotspots site from Conservation International features profiles of more than 30 ecologically important areas of the world, including island hotspots. In addition to regional profiles, the site offers a number of resources such as a terrestrial vertebrate species database, a glossary, maps, and related references.
http://www.biodiversityhotspots.org/xp/Hotspots/

Conservation International Marine Portal
The Marine Portal from Conservation International provides access to over 1000 marine-related documents and publications, hundreds of websites and related resources, and information for regional and issue-specific experts and contacts. The portal is an interactive web-based tool designed to increase capacity building, bridge information gaps, expand communication networks, and serve as a springboard to other sites and resources of interest.
http://portals.conservation.org/marine

Conservation Maven
Conservation Maven offers an online hub for conservation that keeps people connected to new research, news, and more. Topics include marine science, freshwater, wetlands, birds, and more.
http://www.conservationmaven.com/

Conservation Partnerships
The Nature Conservancy supports this online resource center to help conservation practitioners learn how to create and manage more effective partnerships for greater conservation impact. The website leads users through six interactive lessons. The website also hosts a searchable library of reports, case studies, and sample documents on how to put partnership concepts into action.
http://www.conservationpartnerships.org/

Conservation Resources for the Houston Metro Area
Sounds like a good idea: The Houston Intramet website is designed to introduce private landowners and others to local conservation resources. The website covers the 8-county Houston metro region providing tools and resources to support wildlife habitat, open space, and energy efficiency.
http://www.houtonintrament.org

Conservation Service Corps
The 21st Century Conservation Service Corps is the modern day equivalent of the Civilian Conservation Corps. The partnerships engage young Americans in public lands, community green spaces, and water restoration. Check the website for participating programs and complete details.
http://21csc.org/

Conservation Sew Mates
Conservation Sew Mates was established to support wildlife conservation efforts. Sew Mates toys are made in the Philippines and sold in Hong Kong, with proceeds going to support whale shark research.
https://www.facebook.com/CSVsewmates?fref=ts

ConservationEvidence.Com
The ConservationEvidence.com website collates information on the effectiveness of conservation practice. The website provides hundreds of case studies on a range of subjects including habitat restoration, invasive species management, reintroduction, species management, and habitat management. A separate section summarizes reviews on various aspects of conservation practice, along with a method for adding case studies; additional studies in the marine and aquatic environments could be useful.
http://www.conservationevidence.com/

ConserveOnline
ConserveOnline is an online public library, created and maintained by The Nature Conservancy in partnership with other conservation organizations. The library makes conservation tools, techniques, and experience available to a broad community of conservation practitioners. ConserveOnline offers an open forum for sharing successes and failures, and for connecting scientific research with field-based conservation practice. They welcome anyone with resources to share.
http://conserveonline.org/

Consumers Guide to Afterschool Science Resources
The Consumers Guide to Afterschool Science Resources contains reviews of high-quality, hands-on science content for afterschool programs. It provides a wide range of after school activities, curricula, and more. Reviewed materials include semester- and year-long curricula, activity kits, instructor guides consisting of many related activities, and websites that offer content appropriate for afterschool programs. A brief description of each resource is accompanied by two expert reviewers' detailed commentary.
http://www.sedl.org/afterschool/guide/science/index.html

Consumption and the Environment Webinar Series
This free webinar series is sponsored by EPA's West Coast Climate and Materials Management Forum, with archived presentations available after the webinar.
The series, on the first Tuesday of the month, will explore how we can reduce greenhouse gases by making more sustainable choices that support a vital economy.
http://yosemite.epa.gov/R10/ECOCOMM.NSF/climate+change/consumption

Contrail Count-A-Thon from GLOBE
The 3rd Annual GLOBE Contrail Count-a-thon will be held on October 13th, 2005, during Earth Science Week. Clouds are among the largest variables controlling Earth's global climate and also a main source of uncertainty for scientists studying the atmosphere. Since contrails are difficult to study using satellite data, student observers are invited to help scientists by observing contrails in their area and reporting on the amount and type of contrails present.
http://asd-www.larc.nasa.gov/GLOBE

Convenient Solutions to an Inconvenient Truth
The World Bank offers a series of manuscripts on environment and development. The latest, Convenient Solutions to an Inconvenient Truth: Ecosystem-based Approaches to Climate Change, offers an argument for including ecosystem-based approaches to mitigation and adaptation as an essential pillar in national strategies to address climate change. The book can be read on-line.
http://issuu.com/world.bank.publications/docs/9780821381267

Convention on Migratory Species Family Guide
The encyclopedia of the Convention on Migratory Species is now available online. The guide has fact sheets explaining the history and structure of the convention along with some of the species the Convention seeks to conserve. Additional sections cover threats and challenges to migratory species, interagency outreach (e.g. World Migratory Bird Day), and more. The package of facts sheets can be downloaded in pdf format in eight sections.
http://www.cms.int/publications/family_guide.htm

Converge Magazine: Technology in Education
The Center for Digital Education offers the online magazine, *Converge*, about the convergence of education and technology. In addition to the regular features, it offers quarterly themed Special Reports, including Digital Teaching and Professional Development, Mobility and Security, and more.
http://www.convergemag.com/

The C.O.O.L. Classroom Website
The *Coastal Ocean Observation Laboratory Classroom*, from New Jersey's Jacques Cousteau National Estuarine Research Reserve, is a series of Internet-based instructional modules aimed at middle and high school students, linking classrooms with active oceanographic research investigations. The website includes movie clips, downloadable worksheets and teaching guides, career cards, a glossary, and more.
http://www.coolclassroom.org/home.html

Cool Choices
Cool Choices inspires and assists individuals, communities, and businesses to achieve meaningful reductions in greenhouse gas emissions through voluntary action. The Cool Choices game was developed with serious fun in mind, inspiring individuals to take sustainable actions and record them by making the process fun, social, and easy. Cool Choices game cards identify simple, no- and low-cost sustainable practices that change daily habits into fun, noticeable, and rewarding opportunities.
http://coolchoices.com/

Cool the Earth
Cool The Earth is a free, ready-to-run climate change assembly program that educates K-8 students and their families about climate change and aims to inspire them to take simple actions to reduce their carbon emissions.
http://cooltheearth.org/our-program/

Cool Science
The Howard Hughes Medical Institute offers the Cool Science database with a wide range of resources for educators at all levels, from lesson plans and detailed curricula to tutorials, animations, and laboratory exercises. Visitors can browse the collection or

search the resources by topic, type, or target audience. Topics include ecology, life sciences, biodiversity, and much more.
http://www.hhmi.org/coolscience/resources/SPT--Home.php

Cool Science
The National Energy Technology Laboratory's Cool Science website offers lessons and experiments on a range of energy-related topics including carbon dioxide sequestration, phytoremediation, environmental management, and more.
http://www.netl.doe.gov/coolscience/teach.html#LESSONPLANS

Cool Trail Solutions
The National Trails Training Partnership offers an area of their website devoted to photos and graphics of solutions to a wide array of trail-related problems. The goal is to enhance your resources for trails planning, development, and management with visual ideas from across the country. Share your ideas, or check out how others have solved one of your sticky problems.
http://www.americantrails.org/resources/cool/index.html

Climate One Stop
Researchers attending the United Nations Climate Change Conference in Copenhagen unveiled a website dedicated to gathering and organizing climate data for decision makers, professional scientists, and others. Information search criteria include education, funding, and more. Be sure to add your program to the website.
http://arcserver4.iagt.org/climate1stop/

Cooperative Conservation
Cooperative Conservation describes the efforts of landowners, communities, conservation groups, industry, and governmental agencies who join together to conserve our environment. The website provides details about programs which range from professional training opportunities to an online library of documents related to the creation of this initiative.
http://cooperativeconservation.gov/

Copper River Delta Shorebird Festival
The Copper River Delta Shorebird Festival hosts activities, workshops, and community events. The Delta is part of the Western Hemisphere Shorebird Reserve Network and its Shorebird Festival is one of Alaska's premier birding events, with millions of shorebirds and over 30 species of migratory shorebirds resting and feeding there during spring migration. The Delta is the largest continuous wetland on the Pacific coast of North America.
http://www.cordovachamber.com/index.cfm?showsecondarylinks=true&showcontentlinkID=352&primarylinkID=352 .

Coral Activity Book
Staff from NOAA's National Centers for Coastal Ocean Science and Coral Reef Conservation Program Headquarters developed a new activity book for children about the importance of coral reefs. It is available for downloading from the website.
http://www.coastalscience.noaa.gov/education/crbook.pdf

Coral Bleaching
Flower Garden Banks National Marine Sanctuary offers an overview of coral bleaching, along with a link to the Satellites & Bleaching module on NOAA's Coral Reef Watch website.
http://flowergarden.noaa.gov/education/bleaching.html

Coral Bleaching Predictions
NOAA's Coral Reef Watch offers predictions of mass coral bleaching, providing the probability of bleaching up to four months into the future, with a global seasonal outlook system using sea surface temperature forecasts from NOAA;s operational climate forecast system. The high-resolution 5 km suite includes sea surface temperature (SST), SST Anomaly, Coral Bleaching HotSpots, Degree Heating Weeks, and Bleaching Alert Area products.
http://coralreefwatch.noaa.gov/satellite/bleaching5km/index.html

Coral Bleaching: a White Hot Problem
This month's featured Data Analysis Teaching Activity, *Coral Bleaching: A White Hot Problem,* is recently updated to include 2008 data. *Coral Bleaching* explores the effects of rising ocean temperatures on the coral in San Juan, Puerto Rico. Using four years of water temperature data from ocean observing system buoys, students will compare these data, evaluate trends, forecast 2009 coral bleaching events and discuss the long term effects of elevated water temperatures and coral loss.
http://www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive0406.html

Coral Bleaching YouTube Cartoon Video
The Great Barrier Reef Marine Park Authority posted this humorous video in cartoon form about coral bleaching.
https://www.youtube.com/watch?v=aEdoizgeNJk

Coral Connections in the Gulf
Scientists on board NOAA Ship *Nancy Foster* undertook a cruise to the Flower Garden Banks National Marine Sanctuary, August 21-September 2, 2011. Meet the scientists and read the archived logs.
http://flowergarden.noaa.gov/science/fosterdailylogs2011.html

Coral Cores: Ocean Timelines
The Flower Garden Banks National Marine Sanctuary offers Coral Cores: Ocean Timelines, exploring coral growth rings. The website offers an updated educational activity, giving students and teachers an opportunity to interpret x-rays of coral cores for growth patterns and changes.
http://flowergarden.noaa.gov/science/coralcores.html
http://flowergarden.noaa.gov/document_library/eddocuments.html

Coral Data
The Coral Reef Information System (CoRIS) website is designed to be a single point of access to NOAA coral reef information and data products. The data includes a searchable spreadsheet file of over 3,000 scientific names of coral ecosystem biota, reef names and locations, and lots more. Be sure to spend some time looking through the maps, and pull up some of the many aerial photos.
http://www.coris.noaa.gov/welcome.html .

CORAL Discussion Board
The Coral Reef Alliance announces the CORAL Discussion Board to stimulate dialogue on a variety of issues related to coral conservation. The discussion board will allow individuals, organizations, businesses and government agencies within the fields of marine conservation, park management, science, education, and tourism to seek technical advice and share lessons learned with others in a global network of communication.
http://www.coralreefalliance.org/parks/cdb .

Coral Discovery Kits
NOAA offers downloadable lesson plans to teach about corals at the high school level. These lessons focus on the biology of coral reefs, the benefits they provide to humans, major threats to coral reefs today, and how satellites are used to monitor and maintain the health of reefs. The resources include an online tutorial, an educational roadmap to resources, and formal lesson plans.
http://oceanservice.noaa.gov/education/kits/corals/welcome.html

Coral Disease Database
The Global Coral Disease Database supports coral reef science, management, and decision-making communities in the collation, storage, and liberation of coral disease data. The user-driven, publicly accessible web portal allows users to view and share coral disease data, as well as access information about coral diseases, disease identification, and coral disease monitoring best-practices.
http://www.coraldisease.org/

Coral Ecosystem Connectivity Expedition 2013: Pulley Ridge to the Florida Keys
Ocean explorers investigated relationships between shallow water coral reefs and deeper, twilight zone (mesophotic) coral reef ecosystems of the southwest coast of Florida. Follow along with the expedition through the archives on the Ocean Explorer website.
http://oceanexplorer.noaa.gov/explorations/explorations.html

Coral Ecosystem Connectivity Expedition 2014: Pulley Ridge to the Florida Keys
From August 14-28, 2014, ocean explorers investigated relationships between shallow water coral reefs and deeper, twilight zone (mesophotic) coral reef ecosystems of the southwest coast of Florida. Follow along with this continuing, multi-year exploration through the mission logs, educational resources, and more.
http://oceanexplorer.noaa.gov/explorations/14pulleyridge/welcome.html

Coral Ecosystem Connectivity 2015: From Pulley Ridge to the Florida Keys Expedition
NOAA's Office of Ocean Exploration and Research offers the Coral Ecosystem Connectivity 2015: From Pulley Ridge to the Florida Keys Expedition Web page on its Ocean Explorer website. The expedition, August 22-September 4, 2015 is part of a five-year project, with researchers working to better understand the role that mesophotic reefs may play in replenishing key fish species and other organisms in the downstream reefs of the Florida Keys and Dry Tortugas.
http://oceanexplorer.noaa.gov/explorations/15pulleyridge/welcome.html

Coral Ecosystems
The NOAA Education Resources portal has added a new resource collection, Coral Ecosystems. The materials include information about both shallow-water and deep-sea coral ecosystems, the biology that sustains them, the food web, and threats to their survival such as climate change, ocean acidification, and pollution.
http://www.education.noaa.gov/Marine_Life/Coral_Ecosystems.html

Coral Ecosystems
The NSTA Learning Center offers the archived NOAA Coral Ecosystems Seminar, focusing on impacts to coral reefs. Materials include the downloadable presentation in PowerPoint or pdf, along with an Elluminate Live! application for those with faster connections.
http://learningcenter.nsta.org/products/symposia_seminars/boston08/Corals/webseminarI.aspx

Coral Ecosystems SciGuide
The Coral Ecosystem SciGuide is a new web-based "science toolbox" for teachers and other educators. The Coral Ecosystem SciGuide pulls together Internet resources on coral science and organizes them into three major theme areas for the classroom: coral reef biology, coral ecosystems, and coral conservation. For more information, contact Bruce Moravchik at Bruce.Moravchik@noaa.gov or Alissa Barron at Alissa.Barron@noaa.gov.
http://www.nsta.org/main/news/stories/nsta_story.php?news_story_ID=53036

Coral and Fish Identification Aids
New aids for identifying the species of corals and fishes in the wider Caribbean that can be found during Atlantic and Gulf Rapid Reef Assessment (AGRRA) surveys are now available for downloading. The materials include new photographs, flash cards, and more.
http://www.agrra.org/method/trainingid.html

Coral Hub
The Coral Hub website provides free coral identification resources, especially for Indo Pacific coral genera. A main resource on the website is the Coral Finder Toolkit, offering motivated persons the opportunity to teach themselves how to identify Indo Pacific coral genera regardless of the myriad growth forms expressed by these species. The website has video training and self testing resources, a genus index, and more.
http://www.coralhub.info/

Coral Husbandry Handbook
This book contains the peer-reviewed contributions of a coral husbandry symposium, offering an overview of results and experiences with coral husbandry in public aquaria.
http://www.burgerszoo.eu/over-burgers-zoo/coral-husbandry/table-of-contents

Coral Literature, Education and Outreach Program
The Coral Literature, Education and Outreach (CLEO) Program offers educational modules developed primarily for middle school classes. Each module consists of three segments: background information of the science behind the instrument, a classroom experiment, and a teacher's section. Modules include Coral Spawning, Coral Bleaching, and Effects of CO_2 on Coral Reefs. Note that the website address has changed.

http://www.coral.noaa.gov/index.php?option=com_content&view=article&id=145&Itemid=182

Coral Literature, Education and Outreach Program
The Coral Literature, Education and Outreach (CLEO) Program offers educational modules developed primarily for middle school classes. Each module consists of three segments: background information of the science behind the instrument, a classroom experiment, and a teacher's section. Students will be engaged to plot and manipulate the data, and to witness events live on the Internet via a Coral Cam. Links to further reference and educational materials are also available.
http://www.coral.noaa.gov/cleo/education.shtml

Coral Look-Alike ID Photo Guides
The Caribbean Marine Biological Institute has compiled a series of pictures that show combinations of corals that are often mistaken for one another. The corals highlighted are found around Curacao. Place your cursor on Publications for the drop-down menu, and select from Montastraea, Agaricidae, Brain corals, and the rest.
http://www.researchstationcarmabi.org/

Coral Park Buddy Program
As part of Dive In To Earth Day 2004, divers in the U.S. are being asked to team up with dive buddies and park managers around the world in a campaign to support coral reef protected areas. Participating dive operators, clubs, and associations will organize fundraising events leading up to Earth Day (April 22), and the proceeds will pay for conservation projects at some of the world's most spectacular dive sites.
http://www.coralreefalliance.org/divein/parkbuddy/ .

Coral Portal
The Coral Portal website has been launched to serve as a portal for information, discussion and references on all coral-related subjects including scientific techniques, monitoring methods, and scuba diving locations. It offers links to useful websites, research, and a discussion forum.
http://www.coralportal.com/

Coral Reef Activity Book
The Coral Reef Activity Book is the first in a series of thematic activity books from NOAA's National Centers for Coastal Ocean Science. These books are for grades K-5 and highlight the organisms and issues relevant to coral reefs. The book can be downloaded from website, as can each of a series of regional ocean activity books. Hard copies can be requested by contacting Susan Baker at Susan.Baker@NOAA.gov.
http://www.coastalscience.noaa.gov/education/

Coral Reef Bleaching Module
NOAA's Coral Reef Watch program has developed an interactive lesson for the Bilko software that teaches users how to predict coral bleaching from satellite sea surface temperature data. The lesson and software are both available for free download on the website, along with other modules. The step-by-step lesson follows the operational Coral Reef Watch methodology, so users will gain in-depth knowledge of how the NOAA data are produced.
http://www.noc.soton.ac.uk/bilko/noaa_crw.php

Coral Reef and Climate Change
Through Coral Reefs and Climate Change, COSEE Coastal Trends' newest module offers students the chance to explore the coral reefs of Pacific islands by clicking on symbols in the interactive or by using the menu to the left to investigate a question.
http://www1.coseecoastaltrends.net/modules/coral_reefs_and_climate_change/get_started/

Coral Reef Conservation Program
NOAA's Coral Reef Conservation Program offers different ways to stay up-to-date with coral news. The website homepage links to Corals in the News, and the Education and Resources pages offer many useful resources. Subscribe to their newsletter, like their Facebook page, get RSS feeds, and more.
http://coralreef.noaa.gov/

Coral Reef Conservation Program Web Site
The NOAA Coral Reef Conservation Program (CRCP) redesigned and updated its program website. The site contains several key sections including: News and Highlights, Funding Opportunities, and Outreach and Education, as well as background information about the program, subscription information for the program newsletter and contacts for media inquiries. This is a companion site to NOAA's Coral Reef Information System.
http://www.coralreef.noaa.gov
http://www.coris.noaa.gov

Coral Reef Ecosystem Research Plan
The NOAA Coral Reef Ecosystem Research Plan defines the national and regional research essential to addressing the management challenges presented by coral reef decline; providing a national perspective on the research needed to address the range of stresses affecting the health of coral reef ecosystems; summarizing the management and issues that will drive research at the regional level; and focusing on the use of research to guide effective implementation of ecosystem-based management strategies.
http://coris.noaa.gov/activities/coral_research_plan/

Coral Reef Ecosystems
This new website from the National Park Service is a collaboration between Ocean and Coastal Resources Branch and the Office of Outreach and Education. Ten National Parks with coral reefs attract more than 1.5 million visits per year. The National Park Service is working to restore and maintain the biological and recreational values of coral reef parks. The website offers links to the parks, NPS articles about coral reefs, and more.
http://www.nature.nps.gov/water/coralreefs/

Coral Reef Ecosystems: Educating the Masses Blog
This blog has originated as a means to help organize large efforts to educate the public on the plight of coral reef ecosystems. It is intended for use by experts in coral reef biology and education, and is not meant to be used as a resource on general coral reef biology. It is hoped that contributors would be those who would serve as educators or those managing larger efforts, and that this forum be used to help design and organize one or more major efforts through local, national and global media outlets.
http://coral-educate.blogspot.com/

Coral Reef Education and Outreach Library
This international library is an online catalogue of tools and publications that can be used to increase awareness about coral reefs. Each entry in the library contains a brief description of the publication and information on how to obtain it. Some publications are available to download directly from the library. In the library you will find descriptions of: brochures, books, posters, fact sheets, materials from marine parks, teacher's guides, videos and other coral reef educational materials.
http://library.coralreef.org
http://fmp.coralreef.org/library/home.htm
http://www.coralreef.org/tools/teachers.html

Coral Reef Education and Outreach Materials
NOAA's Coral Reef Conservation Program offers links to education and outreach materials about coral and coral reefs from a variety of sources. The website offers background information, an online glossary, and links to a wide variety of activities and lesson plans. The 2008 Coral Reef Educational Resources CD is available online. These classroom materials cover a wide range of topics related to coral reefs, including basic coral reef biology, ecosystems, human use, threats, and conservation efforts.
http://www.coralreef.noaa.gov/outreach/welcome.html

Coral Reef Educational Resources CD
The 2008 Coral Reef Educational Resources CD is a collection of coral reef education and outreach materials. The resources cover a wide range of topics related to coral reefs, including basic coral biology, coral reef ecosystems, human use, threats, and conservation efforts. The downloadable CD offers background information, lesson plans and activities, posters, videos, and much more.
http://coralreef.noaa.gov/outreach/resourcecd08/welcome.html

Coral Reef Film Materials
The Great Barrier Reef Marine Park Authority (GBRMPA) worked with Disney Pixar© To develop a CD of educational materials related to the film *Finding Nemo*. The CD also contains "Fishy Facts" – short videos presenting basic life history information using clips from the movie. The GBRMPA ReefEd website also has many curricular materials, set to Australian educational standards. The MacGillivray Freeman Films'©*Coral Reef Adventure* Teacher's Guide has other downloadable film-related educational materials.
http://www.FindingNemo.com.au
http://www.coralfilm.com/edu.html
www.reefed.edu.au

Coral Reef Messages
Collaborative efforts resulted in a cohesive and relevant U.S. Messaging Campaign for the International Year of the Reef (IYOR). The website offers free, print-ready downloadable ads, as well as branded products like banners, t-shirts, re-usable cloth bags and water bottles, for use in branding IYOR 2008 campaigns. Free registration is required.
http://www.iyorcreative.com/iyor/index.php

Coral Reef Multimedia Project
The Coral Reef Multimedia Project is an interdisciplinary effort to illustrate and explain coral reef dynamics and threats. The project goal is to make this knowledge accessible by combining the visual arts with a scientific background. The project is divided into two

categories, Short Movies and Mini-Documentaries. Short Movies explain a concise subject with documented footage while Mini-Documentaries explore a broader biological theme with cinematography, photography, and visual effects. Check this one out!
http://www.coralreefmultimedia.org/

Coral Reef Park Buddy Program - 2005
The Park Buddy Program aims to support coral park managers in their efforts to protect their biologically diverse and increasingly threatened reefs. The program offers ocean lovers the chance to directly support fundraising efforts for four urgent conservation projects. CORAL is launching its Park Buddy program as part of the annual Dive In To Earth Day event, held each year during the week of Earth Day, April 22nd.
http://www.coralreefalliance.org/divein/parkbuddy/

Coral Reef Photographs
The on-line Coral Reef Ecosystem Database provides public access to new digital photographs from six years of coral reef field studies. Access to images of coral reef species and habitats, taken during studies in Puerto Rico and the U.S. Virgin Islands, facilitates a variety of coral reef research, management and educational opportunities. The searchable database includes images of fishes and invertebrates, hard and soft corals, mangroves, seagrass beds, and other benthic habitats.
http://www8.nos.noaa.gov/biogeo_public/reef_photos.aspx

Coral Reef Photos
Dr. Paddy Ryan has posted coral reef photos to his website in an easy to access set of pages. There are additional categories that may be of interest, so check out this website. School teachers are welcome to use these in their classrooms.
http://www.ryanphotographic.com/coralreef.htm

Coral Reef Report
This new online magazine has been launched to “celebrate the power and mystery of the planet’s coral reefs." The Coral Reef Report features articles, personal stories, and audio interviews with scientists and others. The site also features a rotating photo gallery.
http://coralreefreport.info .

Coral Reef Restoration Project Videos
Follow along with this large scale coral reef restoration project. Additional underwater photos, videos, and other materials are uploaded often.
https://www.youtube.com/user/NatureSeychelles

Coral Reef Studies
The Australian Research Council’s ARC Centre of Excellence for Coral Reef Studies website includes links to hundreds of coral-related publications, many with full text available. The educational resources include webinars, videos, educational booklets, and much more. Other resources include additional links to materials for primary and high school students, coral reef resources, image collections, and more.
http://www.coralcoe.org.au/index.html

Coral Reef Videos
The Hawaii Coral Reef Initiative is committed to educating all types of audiences about the value of coral reefs through a wide range of media. In order to reach a broader

audience, HCRI has expanded its use of the video-sharing websites YouTube and TeacherTube, and includes instructional videos for children on coral genetics and coral community connections, animations, and more.
http://www.teachertube.com/uvideos.php?UID=174264
http://www.youtube.com/hcrirp

Coral Reef Watch Website Redesign
NOAA's Coral Reef Watch website has been reorganized and redesigned. The new pages make it easier for users to discover and understand the data products, and new sections highlight research projects and partnerships. Check out the bleaching outlook, datasets, and the outreach and education materials.
http://coralreefwatch.noaa.gov/satellite/index.html

Coral Reef Website
The NOAA Coral Reef Conservation Program offers its newly redesigned web site focused on coral ecosystems. New resources and products include expanded information on coral biology, values, threats, and conservation techniques; a deep-sea coral section; expanded current news about coral conservation; and new resources for students and teachers. Check out the video on coral spawning, dive the virtual reef, and more.
http://coralreef.noaa.gov/

***Coral Reefs: Canaries of the Sea* DVD**
The National Wildlife Foundation's Climate Change and Wildlife Program, with funding support from NOAA, has produced a multi-media DVD entitled *Coral Reefs: Canaries of the Sea*, narrated by Jack Hanna. The DVD will help raise awareness of the effects of global climate change and other serious environmental problems on coral reefs around the world. It also provides ideas about what people can do to help protect reefs.
glick@nwf.org

Coral Reefs and Climate Change
Coral Watch offers *Coral Reefs and Climate Change*, which comes with an activity CD with complementary resources and activities.
http://www.coralwatch.org/web/guest/home1

Coral Reefs in Hot Water Visualization
The American Museum of Natural History in New York, in collaboration with NOAA has just released a new visualization, Coral Reefs in Hot Water. The visualization uses NOAA satellite data along with bleaching observations from ReefBase and elsewhere to show that coral reefs took the heat in 2010. The website offers links to background information and more.
http://sciencebulletins.amnh.org/?sid=b.v.coral_reefs.20110511

Coral Reefs: Moorea, French Polynesia - Online
COSEE-West invites formal and informal educators who are interested in learning more about coral reef formation and ecology to participate in a free workshop, *Coral Reefs: Moorea, French Polynesia*, to be held this April-May, 2010. Follow an undergraduate class from the University of California, Los Angeles as the students conduct research on Moorea, French Polynesia. Course lectures, student blogs, and a final course symposium will be available live and archived on the web.
http://www.coexploration.org/cosee_west/moorea2010/

Coral Reefs of the World
Coral Reefs of the World is a series of publications presenting the status of knowledge of the world's coral reefs authored by leading scientists. The volumes are organized according to political or regional oceanographic boundaries. Emphasis is on providing authoritative overviews of biology and geology, explaining the origins and peculiarities of coral reefs in each region.
http://www.springer.com/series/7539

Coral Science Web Site
The mission of the Coral Science website is to bridge the gap between coral science and society, and to stimulate awareness for our fragile planet and its ecosystems. They offer scientific articles about ocean related research. Current topics include coral calcification, coral immunology, coral bleaching, and more.
http://www.coralscience.org/home/

Coral Snapshots
In this Bridge Data Analysis Teaching Activity, students will analyze snapshots from coral reefs in and around the Bonaire National Marine Park, calculate biodiversity indices, and determine if marine life is benefiting from federal protection. The activity includes an identification key and automated Excel spreadsheets that help students understand the calculations being completed.
http://www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive1109.html
http://www.marine-ed.org/bridge

Coralax
This film was created by students in Maui Huliau Foundation's Huliau Environmental Filmmaking Club. Inspired by Dr. Suess's The Lorax, this claymation film by middle school students uses 667 images to show how irresponsible shoreline development can impact reef ecosystems.
https://www.youtube.com/watch?v=7p0Gcy6P9GY

Coralis
This website is intended to provide general information about coral and coral reefs. Included is background information, stressors, immunity, and more. It is available in English and Spanish.
http://coralises.org/

Coralpedia
Coralpedia is an identification guide to corals, octocorals, and sponges of Caribbean Reefs, developed through the Overseas Territories Environment Programme fund of the UK government, to assist conservation work in the UK Overseas Territories. Version 1 contains images and descriptions of about 64 Caribbean stony corals, 74 reef sponges and 41 octocorals, along with a few other groups; altogether over 1000 images are included. The information is available on the website and on CD.
http://coralpedia.bio.warwick.ac.uk

Corals and Us Poster
The Corals and Us poster, from NOAA's Coral Reef Conservation Program, presents an artistic and colorful clay rendition of a coral reef, and highlights the top three threats to coral reefs addressed by the program: impacts from Climate Change, Fishing, and

Pollution, along with simple steps each of us can take to reduce these threats at the individual level.
Contact Paulo Maurin at Paulo.Maurin@noaa.gov

CoralSee
CoralSee offers an on-line Acropora coral identification program and an introductory guide to these corals. The interactive website includes the sections Explore the Reef, the Acropora key, and links to more information.
http://www.coralsee.org/

CoralWatch
CoralWatch, developed from a research project at the University of Queensland, offers an inexpensive, simple, non-invasive method for the monitoring of coral bleaching and assessment of coral health. The Coral Health Chart is basically a series of sample colors, with variation in brightness representing different stages of bleaching/recovery, based on controlled experiments. The website also includes a description of an education package, educators' workshop registration, and more.
http://www.coralwatch.org/default.aspx

CoRIS Education and Outreach Search Tool
NOAA's Coral Reef Information System (CoRIS) Library offers a new tool to facilitate retrieval of items that are useful for education and/or outreach purposes. Select "Education and Outreach" under "Publication Type," then enter other search terms as needed, and submit. In addition, the materials can be retrieved by clicking on the "Education and Outreach" link under "Browsable Collections" on the left side of the webpage.
http://coris.noaa.gov/library/search.cgi

CORSACS: Controls on Ross Sea Algal Community Structure
CORSACS is a research cruise to the Ross Sea in Antarctica to study what controls the phytoplankton dynamics. The main research objective was to investigate the relative importance and potential interactive effects of iron, light and CO2 levels in structuring algal assemblages and growth rates in the Ross Sea. The website includes logs, descriptions of life at sea, questions and answers from students, and more.
http://www.whoi.edu/sites/corsacs

COSEE-Coastal Trends
COSEE-Coastal Trends is a thematic center that aims to increase literacy in ocean science, with a focus on understanding dynamic coastal trends through partnerships among scientists, educators, students, and the general public. COSEE-Coastal Trends offers education modules based on scientific research. The classroom resources page d contains a lesson plan developed by a teacher with the help of his/her scientist-educator team. The education modules feature movies, video interviews, and more.
http://www.coseecoastaltrends.net/

COSEE Coastal Trends Education Modules
The goal of Coastal Trends, part of the Centers For Ocean Sciences Education Excellence (COSEE) network, is to increase literacy in ocean science with a focus on understanding dynamic coastal trends through partnerships among scientists, educators, students, and the general public. Education modules include dead zones, fish and

physics, from land to the sea, marine bacteria, observing the ocean, and seagrass. A new module is under development on Pacific islands national parks. Check these out.
http://www1.coseecoastaltrends.net/modules/

COSEE-Florida Web Portal
The Florida Center for Ocean Science Excellence in Education provides access to information and data for those interested in ocean sciences and education. The website allows you to search or browse through a growing collection of data and information in addition to search capabilities linking to numerous other websites and search engines. The Online School allows for the development and delivery of complete online courseware. Access is free for instructors, developers and learners.
http://www.coseeflorida.org/

COSEE News
The Centers for Ocean Sciences Education Excellence (COSEE) Network is pleased to announce three new Centers: COSEE Florida, COSEE OCEAN, and COSEE TEK. Find out more by reading the About Us pages on the COSEE.net website. To follow these and other developments, sign up for COSEE Network News. While on the website, check out the resources for educator links.
http://www.cosee.net/about/cnn/

COSEE NOW
The Centers for Ocean Sciences Education Excellence Networked Ocean World (COSEE NOW) is comprised of institutional partners who are using real time information from ocean observing systems to enhance public understanding of the ocean. Central themes of the website include Ocean Literacy, Virtual Community Collaborations, and Ocean Observing Systems.
http://coseenow.net/

COSEE Website
The Centers for Ocean Science Education Excellence (COSEE) is a network of 12 Centers and a Central Coordinating Office. The newly updated coordinating COSEE website offers news and events, information about the centers, and highlights network activities. Visitors can sign up for the monthly newsletter *COSEE Network News*, search for professional development opportunities, download educational materials, and more. Check out "For Educators" and “For Scientists” sections.
http://www.cosee.net/

COSEE-West Resources
COSEE-West distributes supplemental resources to educators during lectures and workshops, many of which are available electronically on their website. Materials include bibliographies, a video list, lectures, educational activities, and much more. Topics range from chemistry to coral reefs, weather and climate to fisheries, and much more. Resources are constantly being added – check back here often.
http://www.usc.edu/org/cosee-west/resources.html

COSEE-West Online
The COSEE-West website offers a rich and diverse set of resources for teachers interested in bringing ocean sciences into the classroom.
Online streaming video lectures and Powerpoint presentations. Presentations by scientists during COSEE-West events are taped and made available to educators online

through the College of Exploration. These lectures provide background information on a variety of ocean research topics as well as data and discussions on the state of current research projects.
Classroom resources. Lesson plans, activities, and articles featured during COSEE-West education workshops are available for downloading on the Resources page, listed by topic and workshop date. The resources cover a wide range of coastal issues, from the deep sea to the shallow coasts, from policy to seabirds and whales. Also included are a California marine science field trip guide and a long list of commercially available (and rentable) marine science videos. Other marine science lessons and information resources are also available on the Curricula and Ocean Literacy pages.
Archived Online workshops. COSEE-West hosts online workshops for educators on current ocean topics. The forums offer information, discussion topics, ideas for lessons, and classroom resources for teachers of all levels and audiences. All of the material is archived online and accessible through the Online Lectures page (hosted by College of Exploration).
Ocean science animations. Short animations on various ocean science topics are available on the Ocean Tube link from the homepage. Animated shorts appropriate for both secondary and elementary levels are featured (and more are in the planning stages).
http://www.usc.edu/org/cosee-west

COSEE SE
COSEE SE combines efforts with scientists and educators to improve science education, facilitate awareness of ocean sciences careers, increase outreach and understanding of research, and bring ocean sciences to students and the public. The website offers news and events, along with teacher's and scientist's sections with links to background about the South Atlantic Bight. Check out. the new publication for middle school educators on marine debris.
http://www.cosee-se.org/

CosmoLearning
CosmoLearning is an educational website committed to improving the quality of homeschooling, teaching, and student excellence. Designed for educators and self-learners and organized according to traditional curriculum standards, CosmoLearning provides courses, video lectures, documentaries, images, books, and other multimedia. Subjects include Environmental Science, Geology, and much more.
http://www.cosmolearning.com/

Counting Plastic
Deep Sea News has an article on figuring out how much plastic is in the ocean. Check this out for a quick review, then click on the links for more in-depth information, then the home page for other great articles.
http://deepseanews.com/2013/12/how-do-you-figure-out-how-much-plastic-is-in-the-ocean/

CoVis-Weather World 2010
The Weather World 2010 Project is a framework for integrating current and archived weather data with multimedia instructional resources. The website includes open ended projects and classroom activities along with teaching guides on weather-related topics. The website also contains modules on meteorology, remote sensing, and reading weather maps, along with archived weather case studies.

http://ww2010.atmos.uiuc.edu/%28Gh%29/guides/crclm/home.rxml

Cradle of the Earthquake
NOAA's Office of Ocean Exploration and Research offers archives of the *Cradle of the Earthquake: Exploring the Underwater San Andreas Fault 2010 Expedition*, which took place September 16-October 2, 2010. The website offers daily logs, videos and images, lesson plans, and more.
http://oceanexplorer.noaa.gov/explorations/10sanandreas/welcome.html

Crash Course on Climate Change
This Dumb Scientist blog post by Bryan Killet, a NASA/Caltech scientist, was written for teenagers to explain climate change and the impact of human-generated CO2.
http://dumbscientist.com/archives/crash-course-on-climate-change

Create A Graph
The National Center for Education Statistics offers a Create-A-Graph section in their Kids Zone on the website. This tool helps users make different charts and graphs, with options for customizing each type. A tutorial explains which kind of graph is best for a particular situation.
http://nces.ed.gov/nceskids/createAgraph/

Creating Coastal Stewardship Through Science Curriculum Guides
The Point Reyes National Seashore website hosts a wide range of educational materials. Of special note are seven curricular guides created by teachers for teachers to provide middle school students with the opportunity to observe natural processes at Point Reyes National Seashore, to encourage a greater interest in science and environmental stewardship. Pacific gray whales, northern elephant seals, and the San Andreas Fault, are highlighted.
http://www.nps.gov/pore/educate_curriculum.htm .

Creative Conservation E-Learning
This company designs, develops, and teaches professional development e-Learning programs to meet the needs of your organization. Each design is a unique blend of current e-Learning technologies and proven methodologies with an emphasis on learning. Courses include Designing for Distance, Project WILD, and Project Learning Tree professional development workshops.
http://www.creative-conservation.com/index.htm

Creative Gallery on Sustainability Communications
The United Nations Environment Programme (UNEP) has created an online database of corporate and public advertising campaigns specifically dedicated to sustainability issues and classified by more than a dozen sustainability themes, including *Seas and Oceans*. The campaigns highlighted address sustainability issues through various themes, tones, types of media and strategies.
http://www.unep.fr/pc/sustain/advertising/ad/ad_list.asp?cat=all

CreatureCast
CreatureCast is a collaborative blog produced by members of the Dunn Lab at Brown University, along with assorted friends. The project focuses on zoology in the broad sense, and serves as a forum to present original content both interesting and beautiful. Check out Six tips for achieving invisibility, How to hide, and many more.

http://creaturecast.org/
http://science360.gov/series/creaturecast/046c0edd-2c5a-4e4d-9d0b-391630a35841

CREEC on Facebook
The California Regional Environmental Education Community (CREEC) Network is now on Facebook, and will post links to, and summaries of, EE research, capacity building, conferences, model school descriptions, and more.
http://www.facebook.com/creecnetwork

CREEC Resource Directory
Search for environmental education news and resources in California with the California Regional Environmental Education Community (CREEC) Networks' resource directory. Topics include community events, educational resources, training and professional development opportunities, grants/contests, and more. The resource directory offers links to over 2500 providers and resources of environmental education in California. Topics include ecology, ocean ecosystems, biodiversity, and much more. Search by county, bilingual availability, grade level, academic focus, and much more.
http://creec.edgateway.net/cs/creecp/search/creec_res

Creep into the Deep
WhaleTimes' Creep into the Deep Virtual Research Mission is designed for grades 3-6 classrooms and creates a connection between scientists and students. Upcoming missions will take place July 19-24, 2015 (Vision and Bioluminescence in the Deep-sea Benthos II) and September 21-31, 2015 (Deep-Pelagic Nekton Dynamics of the Gulf of Mexico).
http://whaletimes.org/?page_id=86

Crisis Guide: Climate Change
The Council on Foreign Relations offers this six-chapter interactive video series on global warming. Experts discuss different aspects of global warming, including recognizing the problem, addressing the sources and impacts, and weighing the options.
http://www.cfr.org/climate-change/crisis-guide-climate-change/p17088

Crittercam: See What the Animals See
What do marine animals do when we're not around? National Geographic's Crittercam allows researchers to follow wildlife through the use of advanced monitoring equipment attached to the animal. The Crittercam website has maps, lesson plans, and activities.
http://www.nationalgeographic.com/crittercam/index.html .

Crocheting a Coral Reef
You may use this for your students under the category *Anything's Possible*. In a woolly celebration of the intersection of higher geometry and feminine handicraft, and in testimony to the disappearing wonders of the marine world, the Institute for Figuring is crocheting a coral reef. Using the techniques of hyperbolic crochet discovered by mathematician Daina Taimina, the Institute has been evolving a wide taxonomy of reef-life forms - loopy "kelps", fringed "anemones", and curlicued "corals."
http://theiff.org/exhibits/reef.html

Crossing the Shoreline: The Gulf of Mexico
This three-week curriculum unit from DIG (Diversity & Innovation in Geoscience) Texas Blueprints links teachers to a variety of online activities and information about the Gulf of

Mexico. Student learn map skills, analyze ocean circulation, and much more.
http://serc.carleton.edu/dig_blueprints/units/unit2.html

Cruise to Northwestern Hawaiian Islands Marine National Monument
The NOAA ship *Hi'ialaka*i undertook a 28-day voyage to the farthest reaches of the Northwestern Hawaiian Islands. This multidisciplinary research expedition included a benthic habitat mapping team, maritime archaeologists, and interpretation of this research through education and outreach specialists. The crew of 20 scientists and educators conducted studies at Kure Atoll, Pearl, and Hermes Atoll.
http://sanctuaries.noaa.gov/missions/2006nwhi/

Cruises and Virtual Expeditions to the Charleston Bump
From August 2-13, 2003 scientists explored the Charleston Bump, a complex bottom feature of great topographic relief located southeast of Charleston, South Carolina. The rocky, erosion-resistant rise impedes the flow of the Gulf Stream, deflecting it offshore and creating a zone of gyrating eddies and swift, narrow currents. Background material, daily logs, photodocumentaries, a video gallery, and lesson plans are available.
http://oceanica.cofc.edu/home.htm

Cruising Classroom
The Cruising Classroom, owned by the UCLA Institute of the Environment, introduces 4-12th grade and college students to the Santa Monica Bay. Participants are engaged through hands-on scientific explorations and dialogs with instructors. Students learn about physical oceanography, ocean chemistry, and marine organisms by collecting and analyzing a variety of physical, biological and chemical data, using the sampling equipment aboard the *R/V Sea World UCLA*.
http://www.ioe.ucla.edu/seaworld/

Crustacea.net
The Australian Museum offers Crustacea.net, an interactive information retrieval system for crustaceans of the world. The website offers interactive keys, glossaries, and more.
http://crustacea.net/

Cultural Diversity
NAAEE and EETAP offer this website with information about perspectives and approaches for environmental education to remain effective and relevant to diverse populations, both locally and globally. The website includes information and tools focusing on a specific topic such as cultural competency in your organization, programs, membership, partnerships, and plans. Each topic discussion includes an assessment tool, relevant articles, a mini-lesson, success stories, glossary, and more
http://www.naaee.org/programs-and-initiatives/diversity/cultural-diversity-eetap

Cultural Resources Program Website
The U.S. Fish and Wildlife Service (USFWS) Cultural Resources Program website offers information on the many facets of the program at USFWS, as well as past issues of the *Historical Happenings* newsletter.
http://historicpreservation.fws.gov

Cultural Resources Toolkit
The MPA Center has launched an online draft Cultural Resources Toolkit. It provides background information on cultural resources such as shipwrecks, archaeological sites,

and sites important to indigenous people. Topics include a Cultural Landscape approach; Community and stakeholder engagement, outreach and communication; Research, data, monitoring and evaluation, and more.
http://marineprotectedareas.noaa.gov/toolkit/

Culturally Relevant Resources for Environmental Science Instructors
This resource guide offers websites, print publications, organizations, videotapes, and more that provide culturally-contextual learning on environmental science for indigenous students. Note that the information is from a publication issued in 2000.
http://tribalcollegejournal.org/themag/backissues/winter2000/winter2000resource.html

Curious George Educational Materials
Leverage Curious George's appeal to bring earth science learning to young kids. PBS offers downloadable resources for educators. The resources outline how to set up and run hands-on "Curiosity Centers" where children can make their own discoveries about sand, water, soil, wind, and recycling. The resources include simple materials lists, learning goals, leader notes, and tips for success.
http://pbskids.org/curiousgeorge/parentsteachers/activities/

Curriculum Based Programs
The National Park Service offers links to education resources of more than 110 national parks through this website. The resources include virtual field trips, lesson plans, student activities, and more.
http://www.nps.gov/learn/curriculum.cfm

Curriculum Catalogue
The World Ocean Observatory recently updated the Curriculum Catalog within the Ocean Classroom section of the website. The catalogue offers links to educational content, from lesson plans and informal educational activities to descriptions of internships and professional programs. Check this list out to see what you may have missed.
http://thew2o.net/content/curriculum-catalogue

Curriculum Development and Application Guides
The Northwest Center for Sustainable Resources offers these guides designed to assist educators in the development of curriculum and the application of supporting instructional technology. Resources include the *Toolbox for Curriculum Documentation and Testing* chapters include protocol development, documentation, and testing. *Imaging Technology Using Google Earth and NASA World Wind*, a Student Questionnaire – Science as a Process and more.
http://www.ncsr.org/materials/CurriculumDevelopmentandApplicationGuides2.html

CurriculumHub
The Veggie Van Organization facilitates CurriculumHub to promote sustainable education. Lesson plans focus on sustainable energy.
http://www.curriculumhub.com/twiki/bin/view/Main/WebHome

Customizing TED-Ed
TED-Ed encourages use of their videos to create customized lessons. Check out this quick video for ideas.
http://ed.ted.com/tour

Cyberlearning Educators' Corner
The Cyberlearning Educators' Blog aims to bridge cyberlearning research with classroom practice. The blog is meant to be a resource for people interested in the design and development of innovative learning technologies that are informed by and inform the understanding of the processes of learning. Examples include augmented reality, animated storytelling, educational gaming, and more.
http://www.circleducators.org/

The Cycle
RecycleBank offers The Cycle, an animated interactive look at the process of single stream recycling and materials reprocessing, following theoretical recyclables after they are collected. The Cycle takes viewers through each step of the process.
http://www.explorethecycle.com/

Dangers of Plastic Bags
Mobile Bay National Estuary Program has posted a pdf of a PowerPoint presentation on the dangers of plastic bags. It discusses the problems and costs of plastic bags to the environment and bans on their use.
http://www.mobilebaynep.com/site/Forefront/TheDangersofPlasticBags.pdf

Dartmouth Flood Observatory
The Dartmouth Flood Observatory performs research and collects data on the space-based measurement of surface water for research, educational, and humanitarian applications. The Active Archive of Large Floods section hosts additional materials, including animations and other visualizations.
http://www.dartmouth.edu/~floods/index.html

Darwin Initiative
The Darwin Initiative is a small grants program, funded and administered by the UK Department for Environment, Food and Rural Affairs, that aims to promote biodiversity conservation and sustainable use of resources around the world. Project areas include institutional capacity building, training, research, work to implement the Biodiversity Convention, and environmental education or awareness. The website includes links to newsletters, funding initiatives, project information, and much more.
http://www.darwin.gov.uk/

Data in the Classroom
Data in the Classroom is a new online resource for teachers interested in using real scientific data in their teaching. The NOAA Ocean Data Education (NODE) Project is developing curriculum for grades 5-8 designed to help teachers and students use real scientific data to explore dynamic Earth processes and understand the impact of environmental events on a regional or global scale.
http://dataintheclassroom.org/

Data Explorer
Online access to NOAA's National Ocean Service spatial data collections, such as nautical charts, coastal maps, environmental monitoring records, and more, is available through this website. The material can be searched by geographic area, keyword, or topic.
http://nosdataexplorer.noaa.gov/nosdataexplorer/

Data Nuggets
Data Nuggets is a website designed to connect classrooms with scientific data. The website provides worksheets that bring real data into the classroom, guiding students through the scientific method while building their quantitative skills. Check out Do invasive species escape their enemies?, Coral bleaching and climate change, and more.
http://datanuggets.org/

Database of Island Invasive Species Eradications
The Database of Island Invasive Species Eradications from Island Conservation is a tool for conservation practitioners which contains 1,182 documented successful eradications of invasive vertebrates on 762 islands. Data from each project includes information on the island, methods used in the eradication, and contact information for people knowledgeable about the eradication. The database offers the opportunity to analyze trends in past eradication projects.
http://eradicationsdb.fos.auckland.ac.nz/

Database of the Maritime Traffic in the Caribbean
The Regional Marine Pollution Emergency Information and Training Center for the Wider Caribbean has developed a GIS-based database of maritime traffic in the wider Caribbean Region. It provides a visualization of the aggregated routes and the traffic density, along with additional features. Note that the access to the tool is secure; see the website for details.
http://www.cep.unep.org/news/rac-rempeitc-launches-its-new-gis-based-database-of-the-maritime-traffic

Data.gov
Educators and others can access over 300,000 datasets generated by the federal government. The Data.gov website includes searchable catalogs providing access to raw datasets from many federal agencies, along with tools enabling users to examine this data in different ways. Click on the FAQ link at the bottom of the page for an overview and tutorial.
http://www.data.gov/

DataStreme Ocean Website
DataStreme Ocean is a semester-long distance-learning course for precollege teacher enhancement that is partially delivered via the Internet. It is an initiative of the American Meteorological Society/National Oceanic and Atmospheric Administration Cooperative Program for Earth System Education. The course website offers a comprehensive sampling of ocean information especially suitable for learning in an Earth system perspective.
www.ametsoc.org/amsedu/DS-Ocean/home.html .

Dauphin Island Sea Lab Resource
The Dauphin Island Sea Lab educators offer many resources for students and teachers from the K-12 and Teacher Education website. Many presentations offered at past conferences are available for downloading online, along with activities, teacher manuals, and more. Check out *Mr. Sand* and the accompanying teacher manual, and the Seagrasses Slideshow.
http://dhp.disl.org/resources.html

Davidson Seamount: Exploring Ancient Coral Gardens
NOAA's Ocean Explorer program has launched *Davidson Seamount: Exploring Ancient Coral Gardens*, the website for their first expedition of 2006, which runs from January 26-February 4, 2006. The seamount is a vast underwater mountain 75 miles off the coast of Monterey, California, and more than 4,000 feet below the sea surface, created by volcanic activity. Seamounts are an important habitat for deep-sea corals and demonstrate a high degree of endemism.
http://oceanexplorer.noaa.gov/explorations/06davidson/welcome.html

A Day in the Deep
A Day in the Deep is a children's book for ages 4-9, is written by Kevin Kurtz and published by Sylvan Dell. It can be previewed (in English and Spanish) from the website. Additional materials include teaching activities, quizzes, links to related websites, and more.
http://www.sylvandellpublishing.com/bookpage.php?id=DayDeep

A Day in the Life of a Drop
A Day in the Life of a Drop, from the EPA, is a set of activities designed to help students in grades 3–5 understand the connections between the source of the water they use and the ways their water use habits affect the environment and human health. Students also learn how to reduce their impacts and engage family members. Materials include a teachers' guide, student worksheets, a spreadsheet to track water use at home, and more.
http://www.epa.gov/watersense/water/drop.htm

Dead Planet, Living Planet
The report, *Dead planet, living planet: Biodiversity and ecosystem restoration for sustainable development* documents successful case studies referencing thousands of restoration projects ranging from deserts and rainforests to rivers and coasts. The report provides recommendations on how to avoid pitfalls and how to minimize risks to ensure successful restoration. It is downloadable from the website and can be read online as an interactive e-book.
http://www.grida.no/publications/rr/dead-planet/

The Dead Zone
This website from the Science Museum of Minnesota is designed to teach elementary school kids about the Gulf of Mexico dead zone. The interactive website features videos, animations, and activities. It is available in English and Spanish.
http://www.smm.org/deadzone/

Decision Making in a Changing Climate
This World Resources Report, Decision Making in a Changing Climate, includes 12 case studies of real world responses to climate change, such as wildfire management in Brazil, information sharing on agriculture in Mali, and glacial flood management in Nepal.
http://www.worldresourcesreport.org/

Declining Expectations - The Phenomenon of Shifting Baselines
This instructional guide, part of the marine fisheries curriculum from the Northwest Center for Sustainable Resources, is designed to provide instructors with lecture support on the concept of shifting baselines and its application to marine fisheries. Shifting baselines are defined and their contribution to fishery declines discussed. Various

methods that are used to establish historical baselines are described and illustrated with case studies. There are both pdf and annotated PowerPoint downloads on the subject.
http://www.ncsr.org/materials/index.html

Deep Argo: Diving for Answers in the Ocean's Abyss
Check out this news article from Climate.gov, exploring new research into heat energy storage from global warming. And be sure to check out additional news, teaching resources, and much more on the website.
http://climate.gov/news-features/climate-tech/deep-argo-diving-answers-ocean%E2%80%99s-abyss

Deep ATRIS
The U.S. Geological Survey has developed the Deep Along-Track Reef-Imaging System (Deep ATRIS) to support its mapping activities and the ground-truthing of acoustic, lidar, and satellite imagery of submerged coastal environments. Deep ATRIS is capable of surveying to depths of 30 meters and acquiring 12-bit color digital images at 9 frames per second. They offer Deep ATRIS on a cost-sharing basis to other researchers and resource managers.
http://coastal.er.usgs.gov/remote-sensing/advancedmethods/deepatris.html

Deep Coral Cruise Virtual Tours
NOAA scientists launched an interactive Google Earth page documenting a recent research cruise between San Diego and Seattle. Remotely operated vehicle surveys were conducted from 200-600 meters depth to investigate deep-water sponges and corals. The virtual tours are a 'first-look' data product for sharing preliminary cruise results. Fly along with the researchers in your browser by clicking on one of the five virtual tours.
http://swfsc.noaa.gov/ge.aspx?ParentMenuID=647&TopPG=16838&Project=DeepCoralWC2010

Deep Earth Academy Climate Change Resources
The Deep Earth Academy (formerly JOI Learning) facilitates and develops programs and materials based on scientific ocean drilling expeditions and Earth Systems Science to strengthen students' mathematics, science, and analytical skills. The website hosts lessons related to climate change plus a number of resources that can be provided free of charge, including posters, DVDs, drilling globes, and more.
http://www.oceanleadership.org/learning/climate

DEEP Game
The Deep-sea Extreme Environment Pilot (DEEP) game was built to spread interest in the world's oceans, with a specific focus on deep-ocean environments. It is designed to be a stand-alone exhibit in aquariums, informal learning centers, and elsewhere, and can also be used in undergraduate classrooms to enhance student's understanding of ocean observatory systems.
http://siogames.ucsd.edu/deep.html

Deep Scope 2005
NOAA Ocean Exploration has launched the Deep Scope 2005 website in support of the current exploration, which runs from August 19–September 3, 2005. Utilizing the Johnson-Sea-Link submersible and deploying a unique deep-sea observatory camera system to observe as unobtrusively as possible, scientists aboard the Harbor Branch

Oceanographic Institute's research vessel *Seward Johnson* will examine the deep-sea environment in the Gulf of Mexico from the perspective of the animals living there.
http://oceanexplorer.noaa.gov/explorations/05deepscope/welcome.html

Deep Sea 3D
Deep Sea 3D is the new underwater adventure from IMAX, transporting audiences deep below the ocean surface in different locations around the globe and offering never-before-seen, up-close encounters with a wide range of undersea life. Moviegoers, with only their 3D glasses for a diving mask, will be able to swim alongside some of the most exotic creatures on the planet, from the bizarre Rainbow Nudibranch to the Giant Pacific Octopus. The website includes a film trailer along with an educator's guide to the film.
http://www.californiasciencecenter.org/Imax/Features/DeepSea3D/DeepSea3D.php

Deep Sea Coral Education
NOAA's Coral Reef News from March, 2011 offers links to a variety of educational materials to help teach students about deep-sea corals, their ecosystems, and how scientists study them. Lessons include Deep Gardens, Who's New in the Deep Sea, and more.
http://coralreef.noaa.gov/aboutcrcp/news/newsletter/

Deep-Sea Coral Research
The Deep-Sea Coral Research & Technology Program Report to Congress 2014 features an overview of the program's continuing regional three-year field studies. Accompanying the details of the fieldwork are video and photos in all regions of the U.S.
http://www.habitat.noaa.gov/protection/corals/deepseacorals.html

Deep-Sea Creatures Quiz from National Geographic
Dive to the depths to test your knowledge of some of the Earth's most unusual creatures. Try this quiz and read the accompanying background information. And while you're on the website, check out the other games including weather wizard, frogs, and much more in the archives.
http://magma.nationalgeographic.com/ngexplorer/0309/games/game.cgi .

Deep Sea ID
Deep Sea ID is a field guide interface to the World Register of Deep-Sea Species (WoRDSS) that offers access to taxonomic information for over 20,000 deep-sea species, over 350 high-resolution photographs of deep-sea specimens, and links to online taxonomic tools, references, and more. The app is designed for the scientific community but also offers a visual tour of the biodiversity of deep sea life to educators and the general public. The app is free for iPhones and iPads.
https://itunes.apple.com/gb/app/deep-sea-id/id615240268?mt=8

Deep Sea Research Blog
Michelle Kay is a 6th grade science and marine biology teacher in Honolulu, Hawai'i. She is currently on a deep-sea fish research cruise as the teacher-at-sea in Monterey Bay, California. Read her blogs from this and previous cruises.
http://deepblusea2009.blogspot.com/

Deep-Sea Images and SERPENT
The SERPENT (Scientific and Environmental ROV Partnership using Existing Industrial Technology) project collaborates with the oil and gas industry to carry out deep-sea

scientific research on habitat mapping, sea-bed recovery rates from disturbance, and a variety of other experimental approaches to document biodiversity in the deep sea. The website hosts Education pages for teachers with lesson plans and more. The Kids pages include fun facts and interviews with the SERPENT team members and partners. The Gallery pages link to additional video and image galleries, while Publications hosts both SERPENT newsletters and a bibliography with many downloadable articles.
http://www.serpentproject.com/

Deep Time
Teachers' Domain hosts these resources on geological time for grades 6-12 from WGBH Educational Foundation. In order to understand how such slow processes like geologic change and evolution could produce massive physical and biological changes on Earth, one must try to grasp "deep time." The website offers a timeline, background essay, links to additional resources, and more.
http://www.teachersdomain.org/resource/tdc02.sci.life.evo.deeptime/

Deep Water Macroalgal Meadows
The 2004 Deep Water Macroalgal Meadows expedition is now online on NOAA's Ocean Explorer website. This expedition studied deepwater meadows of the calcified green alga Udotea sp. in the waters surrounding the Hawaiian Islands. The website includes an essay about the Teacher at Sea experience, a mission summary, an essay on algal meadows in Hawaii, and three major slideshows filled with photos from the expedition.
http://oceanexplorer.noaa.gov/explorations/04algae/welcome.html

DEEPER Guide
The DEEPER Guide is a resource guide for initial teacher educators, staff, and students in faculties of education to help embed EE into their pre-service programs. It shares the expertise of environmental educators who have found successful ways of integrating EE into initial teacher education. While focused on Canada, it is equally useful for other interested parties. Chapters include practical recommendations for strategies and practices, a resource appendix, and more.
http://www.oise.utoronto.ca/ese/DEEPER/DEEPER_Guide.html

DeepSea America
The Deepsea Challenger is James Cameron's single-pilot submersible that he took to the bottom of the Mariana Trench. Follow the archives through daily logs, photos, and more as the sub and expedition team traveled on a nation-wide educational tour to highlight the importance of ocean research and green STEAM (science, technology, engineering, arts, and mathematics) education from California to Massachusetts, where the sub has been donated to the Woods Hole Oceanographic Institution.
http://www.deepseaamerica.com/

Deepsea Challenge
Read about James Cameron's solo dive to Challenger Deep, the deepest known point in the ocean. The website offers links to teaching resources, maps, and much more.
http://education.nationalgeographic.com/education/deepsea-challenge/?ar_a=1

Deepwater Canyons 2013: Pathways to the Abyss
NOAA's OER invites formal and informal educators to follow along with an ocean exploration mission to deepwater canyons off the mid-Atlantic coast aboard the NOAA Ship *Ron Brown*. The Jason II ROV will explore the canyon walls of Norfolk and

Baltimore canyons to understand more about the connectivity of deep-sea canyon organisms, associated microbiology and food webs, and the physical, chemical, and geological conditions associated with each canyon ecosystem.
http://oceanexplorer.noaa.gov/explorations/13midatlantic/welcome.html

Deepwater Canyons 2012: Pathways to the Abyss Expedition
NOAA's Office of Ocean Exploration and Research offers the Deepwater Canyons 2012: Pathways to the Abyss Expedition on its Ocean Explorer website. The postings for the expedition, expected to run from August 15-October 1, 2012, include mission logs, videos and images, lesson plans, and more. A new feature in addition to Ask an Explorer is the opportunity for live Skype sessions from the North Carolina Museum of Natural Sciences.
http://oceanexplorer.noaa.gov/explorations/12midatlantic/welcome.html

Deepwater Horizon Incident Website
This Deepwater Horizon Incident website hosts the latest news, trajectory maps and forecasts, links to scientific weather and biological response services to federal, state, and local organizations, and images, much more. On the NOS website, you can learn more about the spill in the April 27 episode of Making Waves, and check out a recent episode of Diving Deeper to learn more oil spills in general and how NOAA responds to these events.
http://response.restoration.noaa.gov/deepwaterhorizon/
http://www.incidentnews.gov/incident/8220
http://oceanservice.noaa.gov/

Deepwater Horizon Oil Spill Contact Information
The Gulf of Mexico Alliance Environmental Education Network offers Gulf States contact information for the Deepwater Horizon Oil Spill as a downloadable Word document. Click on the oil rig drawing on the main page. There is also a Deepwater Horizon Response website which offers news, volunteer links, and additional information.
http://gulfallianceeducation.org/
http://www.deepwaterhorizonresponse.com/go/site/2931/#

Deepwater Horizon: One Year Later
NOAA's webpage, *Deepwater Horizon: One Year Later,* offers a compilation of video links, images, podcasts, and other information about the Deepwater Horizon spill and oil spills in general.
http://oceanservice.noaa.gov/news/features/apr11/dwh.html

Deepwater Horizon Oil Spill Websites

- ***Alaska Oil Spill Curriculum***
- An oil spill curriculum was developed for the Exxon Valdez oil spill. It is available online.
- http://www.pwsrcac.org/outreach/education.html
- ***Bridge Blog on Oil Spill***
- The Bridge, NMEA, and Sea Grant have set up a blog to allow in-depth discussion of the Deepwater Horizon Oil Spill. The blogs include links to information from other sources.
- http://bridge.blogs.wm.edu/oil-spill/

- ***Deepwater Horizon Response – Latest News***
- This website offers updates on the status of NOAA's response to the Deepwater Horizon incident. Explore the links at the top of the page for fact sheets, NOAA roles, and visuals.
- http://response.restoration.noaa.gov/dwh.php?entry_id=809
- ***Deepwater Horizon Incident***
- Many offices within NOAA's National Ocean Service are contributing existing expertise to response efforts for the Deepwater Horizon Oil Spill. This website offers background information and links to websites about this incident and oil spills in general.
- http://oceanservice.noaa.gov/deepwaterhorizon/
- ***Deepwater Horizon Oil Spill***
- The Encyclopedia of Earth offers a webpage with a comprehensive overview of the spill, from the ecological concerns to the government response. In addition, the sources for the information are available and offer active links.
- http://www.eoearth.org/article/Deepwater_Horizon_oil_spill
- ***DeepWater Horizon Oil Spill Portal***
- Rutgers University Coastal Ocean Observation Lab is working with partners from federal agencies, companies, universities, and non- profits to develop a portal that consolidates many data streams to help response efforts for the Deepwater Horizon Oil Spill. The portal offers a blog, real-time IOOS glider positioning and links to visualization web pages, links to other response sites, and much more.
- http://rucool.marine.rutgers.edu/deepwater/
- ***EPA Response to BP Spill in the Gulf of Mexico***
- This website from the EPA offers links to information about the EPA's response to the BP spill in the Gulf of Mexico, including data on air and water sampling, dispersants, waste management, and more.
- http://www.epa.gov/bpspill/
- ***GeoPlatform***
- This newly launched website, produced by NOAA, Department of the Interior, EPA and the U.S. Coast Guard, offers map-based real-time spill response information, with timely, accurate information about local shoreline areas impacted by oil. The website integrates the latest data about the oil spill's trajectory with fishery closures, wildlife data, and place-based Gulf Coast resources into an interactive map.
- http://www.geoplatform.gov/gulfresponse/
- ***Gulf of Mexico Oil Spill 2010***
- The Encyclopedia of Life has an oil spill resource page links to Gulf of Mexico Biodiversity (species and habitats) and Information About the Oil Spill and its Effects (government and non-government websites, news and blogs, videos, and books and scientific articles).
- http://www.eol.org/content/page/oil_spill_2010
- ***Oil on the Water: The Physics of Oil Spills***
- This interactive feature on MSNBC's website provides an overview of the physics behind an oil spill. The feature illustrates the physical and chemical processes, known as weathering, that change the oil's properties and behavior after it is spilled into the ocean.
- http://www.msnbc.msn.com/id/37517080/ns/disaster_in_the_gulf#BPs

- ***Resources for Teaching About Oil Spills***
- Windows to the Universe offers links to resources for teaching about oil spills, including Mixing Oil and Water from The Why Files, Bird Baths from National Geographic, and more.
- http://www.windows2universe.org/teacher_resources/main/teach_oil_spill.html

Delaware Sea Grant Social Networking
Delaware Sea Grant invites you to check their activities out through Facebook, Twitter, and YouTube. They will share photos, news, resources, and more through these sources.
http://www.facebook.com/pages/Delaware-Sea-Grant/40576461700
http://twitter.com/DESeaGrant
http://www.youtube.com/deseagrant

DEM Discovery Portal
For those teaching or using GIS in the classroom, this website can save time and effort. The National Geophysical Data Center has created an ArcIMS map interface for locating digital elevation models (DEMs) that are published on the web. This makes it easier for GIS users to locate, preview, and download DEMs. The DEMS may be bathymetric, topographic, or a merged combination of both, ranging from high-resolution coastal DEMs for local studies, to coarser ones with global coverage.
http://www.ngdc.noaa.gov/mgg/dem/

Derelict Fishing Gear Mission
NOAA scientists complete a 6-day research mission exploring the remote habitats of Cordell Bank National Marine Sanctuary and testing methods of removing derelict fishing gear from the seafloor using a Remotely Operated Vehicle (ROV). The website offers background information and mission logs.
http://sanctuaries.noaa.gov/missions/2008cordellbank/

Design a Planet
In September 2005, Astro-Venture, a multimedia website for grades 5-8 highlighting NASA careers and astrobiology research in the areas of astronomy, geology, biology and atmospheric science, will launch *Design a Planet* through NASA Quest. Students can interact with scientists who are developing a program that can model planets with signs of life. Students will also be introduced to a new simulation on the Astro-Venture website that will challenge them to design a planet that would support human habitation.
http://quest.arc.nasa.gov/

Design in the Classroom
Design can make any subject immediately relevant to students by directly relating to their real-life experience. The Cooper-Hewitt National Design Museum offers interactive modules and learning activities which make it easy to see how architecture, graphic, and media design can enhance the teaching of subjects that include mathematics, language arts, and environmental studies. Check out the lessons on contouring and designing an aquarium ecosystem.
http://www.educatorresourcecenter.org/

Designing Conference Posters
Colin Purrington offers these funny but true tips on designing conference posters. Be sure to check out this website.

http://colinpurrington.com/tips/academic/posterdesign

Designing a Resilient Community
With these project resources, students participate in project-based learning over several days as they assess their community's ability to respond to crises that threaten both natural and human systems. Then they develop ideas for redesigning their community to be more resilient. Downloadable materials include instructions and discussion questions, links to resources about resilient communities, and more.
http://www.ecoliteracy.org/downloads/designing-resilient-community

Developing a Framework for Assessing Environmental Literacy
NAAEE has released *Developing a Framework for Assessing Environmental Literacy*, developed by researchers, educators, and assessment specialists in social studies, science, environmental education, and others. A presentation about the framework and accompanying documents are available on this website.
http://www.naaee.net/framework

Dial-A-Buoy
Dial-A-Buoy gives mariners an easy way to obtain weather reports through a telephone. Buoy reports include wind direction, speed, gust, significant wave height, swell and wind-wave heights and periods, air temperature, water temperature, and sea level pressure. Some buoys report wave directions. Coastal weather stations report the winds, air temperature, and pressure; some also report wave information, water temperature, visibility, and dew point.
http://www.ndbc.noaa.gov/dial.shtml

Dichotomous Key Resources
The author of the Agnes Pflumm books offers several resources that can be useful for teaching classification and the use of dichotomous keys. Be sure to check out additional teacher and student resources on the website.
http://www.agnespflumm.com/pond_scum_discover_classified.htm

Dictionary of Numbers
The Dictionary of Numbers is a Google Chrome extension that gives context to the numbers we deal with every day. Dictionary of Numbers puts unfamiliar quantities into equivalents one can recognize.
http://www.dictionaryofnumbers.com/

Digital Coast
The premise behind NOAA Coastal Services Center's Digital Coast website is the understanding that data alone are not enough. Most people need help turning these data into information that can be used when making important decisions about coastal management. This redesigned website provides the data, tools, and training most needed by coastal communities. A wide range of resources are available, from Light Detection And Ranging (LIDAR) data to guidance for local inundation mapping.
http://www.csc.noaa.gov/digitalcoast/

Digital Coast
NOAA Coastal Services Center leads the Digital Coast effort, an information delivery system that offers data, training, tools, and examples needed to turn data into useful information. It is designed to help ensure the wise use and management of coastal

resources. Check out the In Action section to see how and where data and tools can be used to address coastal management issues.
http://www.csc.noaa.gov/digitalcoast/index.html

Digital Coast Newsletter
NOAA's Digital Coast provides easy access to geospatial data, tools, training, and information used to address coastal resource management issues. Content continues to stream in from a variety of sources, including local, state, and Federal agencies. A quarterly newsletter is now available that provides users with updates on new content and notifications about upcoming webinars and other events. Join the Digital Coast mailing lists, Coastal Connections e-newsletter, and more.
http://www.csc.noaa.gov/publications/subscriptions.html

Digital Explorer Collections
Digital Explorer and the insurance group, Catlin Group Ltd., have created a series of teaching resources that utilize content collected by Catlin's sponsorship of ocean science and exploration. Resources include Frozen Oceans, Coral Oceans, and Ocean Experiments. Check these out.
http://oceans.digitalexplorer.com/

Digital Fishers
Help analyze deep-sea videos 15 seconds at a time. Everyone is invited to participate in ocean science research. As you view various animals and their surroundings in the video clip, you can describe what you see by selecting from the fields below the video screen. The fields include sea life, water clarity, seafloor composition, and any other objects you see (natural or human made). Free registration is required.
http://digitalfishers.net/?p=518#more-518

Digital History: A Guide to Gathering, Preserving, and Presenting the Past on the Web
The Center for History and New Media at George Mason University offers this online resource. It serves as an introduction to the web for those "who wish to produce online historical work, or to build upon and improve the projects they have already started in this important new medium." The work is divided into chapters, including *Becoming Digital, Owning the Past?*, and *Preserving Digital History*. The work covers everything from copyright law to site design.
http://chnm.gmu.edu/digitalhistory/index.php

Digital Image Library
The USGS-National Biological Information Infrastructure offers a new website for its rapidly growing Digital Image Library. Containing thousands of images donated by photographers and organizations, the library links images to detailed information such as location, scientific and common names, and habitat and behavior descriptions to support research, education, and decision-making. Currently offering 30,000 images, the website allows multiple ways to browse the collections and select images.
http://images.nbii.gov/

Digital Learning Network
NASA's Digital Learning Network (DLN) provides free, interactive video- and web-conferencing events for educators interested in enhancing their STEM classes by connecting directly with NASA education specialists and subject matter experts. They

also feature live webcasts on the DLiNfo Channel from ten DLN studios. Be sure to submit your request for DLN modules two weeks before the desired event date. Events include Sea Level Rise, Introduction to Robotics in the Classroom, and more.
http://www.nasa.gov/offices/education/programs/national/dln/index.html#.VKIBdf984

Digital Learning Resources
Edutopia celebrates the second annual Digital Learning Day, February 6, 2013, with a compilation of useful resources on digital learning. Topics include teaching with new media tools, video games in the classroom, and more.
http://www.edutopia.org/digital-learning-technology-resources

Digital Library of the Caribbean
The Digital Library of the Caribbean, administered by Florida International University in partnership with the University of the Virgin Islands and the University of Florida, aims to build a cooperative digital library among partners within the Caribbean and circum-Caribbean, providing scholars, students, and citizens around the world with open on-line access to Caribbean cultural, historical and scientific materials.
http://www.dloc.com/

Digital Library for Earth System Education
The Digital Library for Earth System Education is an online library of web-based resources at all educational levels for teaching and learning about the Earth as a system. It can be searched by keyword, grade level, resource type, collection, and by national standards. The updated website offers an improved K-12 Educator's page, Newest Resources in DLESE, and much more. Turn to this website for great resources.
http://www.dlese.org

Digital Library of Earth System Education
The Digital Library of Earth System Education is creating an online library of educational resources and services to support Earth system science education at all levels in both formal and informal settings. A quick search on "marine" came up with 152 entries.
http://www.dlese.org/

Digital Library for Earth System Education Reviewed Collection
The DLESE Reviewed Collection offers access to resources that meet seven specific review criteria: high scientific accuracy, good pedagogical effectiveness, ease of use, clarity and completeness of documentation, motivating for learners, show robustness, and illustrate significance of content. Be sure to also use the drop-down menu to access other collections, including COSEE resources, climate change collection, earth exploration toolkit, and much more.
http://www.dlese.org/dds/histogram.do?group=subject&key=drc

Digital Library of Indigenous Science Resources
The Digital Library of Indigenous Science Resources is an online library collection of text, video, audio, and image files of indigenous science. The library includes knowledge about the natural world as well as methods of teaching and learning about the natural world.
http://www.dlisr.org/index.html

Digital Preservation Tools Showcase
The National Digital Information Infrastructure and Preservation Program works with the Library of Congress to craft solutions to the problems facing a wide array of digital management initiatives across different sectors. Part of their work includes compiling a list of helpful tools for persons within the digital preservation community. Sortable categories include Tool Type, Usage, and more. Visitors will find a brief description, information about the intended user audience, and the basic function of each resource.
http://www.digitalpreservation.gov/tools/

Digital Research Tools
Created by the director of the Digital Media Center at Rice University, this collaborative wiki collects information about tools and resources that can help scholars conduct research more efficiently or creatively. Visitors can browse through topical headings that include Authoring, Blogging, and Data Mining, among others. Visitors can search for specific tools that can help collect data, edit images, make a dynamic map, and more.
http://digitalresearchtools.pbwiki.com/

Digital Storytelling
The Digital Storytelling initiative at Ohio State University define digital storytelling as a short (3-5 minute) movie which uses images, voice, and music to tell a story. The website offers examples such as The Joy of Research, Outside the Glass, and more. The Resources area includes information for those who would like to create their own digital stories with links to copyright-free audio and video sources, along with low-cost or free images.
http://digitalstory.osu.edu/stories/community/

Digital Worlds GIS
Digital Worlds GIS 2 is built from the technology supplied by ESRI. The package is for the education market and gives pupils experience of GIS tools, bridging the gap between education and commercial applications of GIS. Though based in the U.K., the website can offer an introduction to GIS use in the classroom, along with examples of lesson plans. Users have also been able to integrate TerraLook imagery data with the layers using the software.
http://www.digitalworlds.co.uk/

Digging In: A Guide to Community Based Habitat Restoration
This 164-page guide describes how individuals and organizations can become involved in helping to improve and restore coastal wetlands and other coastal habitat in their communities. The guide explains the basic steps of information gathering, site selection, project implementation, monitoring, maintenance, and working with volunteers. The California Coastal Commission will be holding workshops to introduce the guide; see the website for details.
http://www.coastal.ca.gov/publiced/UNBweb/diggingin.html

Directory of Open Access Journals
The Directory of Open Access Journals indexes and provides access to 1,720,260 articles in 9,986 journals from 134 countries, at this time. Subject areas include Biology and Life Science, Social Sciences, and more. Visitors can search by title, keywords, and more.
http://doaj.org

Dihydrogen Monoxide Website
Explore the many special reports, FAQ, a primer on the subject, plus reports on the environment, current research, and other exposés about this often dangerous chemical. (Recent events have proven just how deadly it can be).
http://www.dhmo.org/

Disaster Declaration History
This interactive map tracks presidential disaster declarations across the United States by county, stretching back to 1964. Color-coded by the number of declarations made, the map overview makes it easy to note the most disaster prone areas. Click on a county and get a listing of hazards, including how many declarations made at a county level and into which category they fall. Select "Open" to launch the map.
http://www.arcgis.com/home/item.html?id=6f2c5dcab2f04857b73533fc82456f1d

Disaster Hero
This online game offers a mix of action-based play and disaster quizzes, providing a fun way for children in grades 1-8 to learn what to do in a number of disaster situations, including tornadoes, hurricanes, earthquakes, and floods. The website also offers Information and resources for parents and teachers.
http://disasterhero.com/

Disaster Preparedness Prep Rally Toolkit
Save the Children offers a Prep Rally Youth Service Toolkit to help users host a Prep Rally - an event that educates children and families about emergency preparedness. Help make sure that your community is prepared for the summer season of hurricanes, wildfires, floods, and tornadoes.
http://www.savethechildren.org/site/c.8rKLIXMGIpI4E/b.9085951/k.B899/Get_Ready_Get_Safe_Community.htm

Disaster Preparedness for Seniors by Seniors
This downloadable guide offers practical information about pre-disaster preparedness, with a focus on special needs of seniors.
http://www.redcross.org/images/MEDIA_CustomProductCatalog/m4640086_Disaster_Preparedness_for_Srs-English.revised_7-09.pdf

Disaster Resiliency
NOAA's Coastal Services Center publishes *Coastal Services*, a bimonthly magazine for the nation's coastal resource managers. You can read the magazine online or subscribe to this free publication. The January/February 2006 edition reports on what coastal resource managers are doing to increase their communities' disaster resiliency.
http://www.csc.noaa.gov/magazine/

Disaster Resources
Lyrasis, a nonprofit membership organization dedicated to sustaining and enhancing libraries, offers resources for disaster assistance, prevention and planning, and response and recovery.
http://www.lyrasis.org/Products-and-Services/Digital-and-Preservation-Services/Disaster-Resources.aspx

Discount Gear for Youth Fishing Programs
Pure Fishing Global offers fishing tackle, lures, rods, and reels at discounted prices for nonprofit aquatic education programs and youth events. These include programs and events at national wildlife refuges and elsewhere.
Contact Roxanne Coleman at grcoleman@purefishing.com

Discover Water
The Project WET Foundation offers this educational website for teachers and students. *Discover Water: The Role of Water in Our Lives* is an interactive resource about water and water related topics including the water cycle, ocean, watersheds, water conservation and protection, and more. Educator resources include printable science notebooking pages, classroom activities, assessments, and more.
http://www.discoverwater.org/

Discover Your World with NOAA: An Activity Book
NOAA is celebrating 200 years of delivering science, service, and stewardship. Making this happen leads the people of NOAA from the edge of space to the bottom of the ocean. *Discover Your World with NOAA: An Activity Book* helps you learn more about the world and how NOAA helps explore, understand, and protect our Earth. The book contains 43 different activities, and can be downloaded in full or by individual activity.
http://celebrating200years.noaa.gov/edufun/book/welcome.html
http://celebrating200years.noaa.gov/edufun/book/#book

Discovering Ancient Climates in Oceans and Ice
This TED talk by Rob Dunbar is short, suitable for high school students, and covers sea level rise, ancient coral reefs, and acid oceans in non-technical language.
http://www.ted.com/talks/rob_dunbar.html

Discovering Antarctica
This interactive activity adapted from the British Antarctic Survey introduces some of the physical features and wildlife of Antarctica. Explore Antarctica's mountains, ice shelves, seals, and more through nine videos with accompanying text.
http://www.teachersdomain.org/resource/ipy07.sci.life.eco.discant/

Discovering Antarctica
The Royal Geographical Society and the British Antarctic Survey have created this website which explores life on Antarctica. Visitors can watch a short video clip about the continent, test their existing knowledge with a short quiz, and then participate in a "being there" activity. The site lists all of the resources by format, including audio files, video clips, Word documents, and images. The Teachers' Area offers learning activities for students and teacher notes correlated to each of the main sections of the website.
http://www.discoveringantarctica.org.uk/index.php

Discovering the Living Ocean Manual
Bent Tree Press offers *Discovering the Living Ocean: Laboratory and Field Activities in Marine Biology*, a manual for use in high school and undergraduate marine biology classrooms and suitable for students who have no previous background in biology. The book's 17 chapters of laboratory exercises and 5 chapters of field studies expose students to a broad range of activities in taxonomy, microbiology, invertebrate zoology, ichthyology, oceanography, and more.
http://benttreepress.com/products/labs/marinebio_labs.htm

Discovery Day at the Dauphin Island Sea Lab - Alabama
Discovery Day at the Dauphin Island Sea Lab offers free children's admission to the Estuarium on April 19, 2008, April 12, 2014 from 10:00am to 2:00pm, on Dauphin Island, Alabama.
This family event includes a variety of environmentally-themed children's activities; an Open House at the lab research facilities where the public can meet the scientists; and free kids' admission to the Estuarium, the aquarium at the lab.
http://estuarium.disl.org/

Discovery Day at the Dauphin Island Sea Lab - Alabama
Celebrating 200 Years of NOAA, the Dauphin Island Sea Lab in Alabama is celebrating with a Discovery Day, April 14, 2007, featuring the groundbreaking of a new building at Sea Lab, special NOAA programs and activities, free children's and reduced adult admission to the Estuarium, discounts, and much more.
http://press.disl.org/1_31_07dday.html
http://press.disl.org/3_11_10dday.htm

Discovery Education Lesson Plans
Discovery Education provides digital resources to schools and homes. Lesson plans are grouped by grade level and include topics in earth science, ecology, weather, and much more. Additional resources include Puzzlemaker, Science Fair Central, Professional Development, and more. There are lots of great resources here.
http://school.discoveryeducation.com/lessonplans/

Discovery of Estuarine Environments
This website from the University of Rhode Island Office of Marine Programs and partners describes the geology, water circulation, and significance of estuaries, with a focus on Narragansett Bay. The website includes a virtual field trip, lessons and activities, history and culture, a biota gallery, and more.
http://omp.gso.uri.edu/ompweb/doee/

Discovery Kits from NOAA's National Ocean Service
NOAA's National Ocean Service (NOS) Discovery Kits describe the scientific principles underlying NOS's major programs. Each kit includes an on-line tutorial, a roadmap to resources, and a set of lesson plans. Each module of the kit is designed to work together, but comprehensive enough to be used on its own. Currently available kits include *Corals*, *Tides & Water Level*s, and *Geodesy/Global Positioning*. *Estuaries*, *Non-point Source Pollution*, and *Marine Archaeology* are in development.
http://oceanservice.noaa.gov/education .

Discovery of Sound in the Sea
The Discovery of Sound in the Sea website provides scientific content introducing the physical science of underwater sound and how people and animals use sound to accomplish various tasks. The newly redesigned website offers an interactive learning environment. Interactives are highlighted in the Audio Gallery and Scientist Gallery, with sights and sounds from the sea and interviews with scientists. Visitors can also find background information along with structured tutorials and educational games.
http://www.dosits.org/

Discovery of Sound in the Sea
The redesigned Discovery of Sound in the Sea website is an online resource about the science and use of sound in the ocean. A new main section offers a Frequently Asked Questions and a Facts and Myths section. New on-line tutorials on the Science of Sound and the Effects of Sound on Marine Animals, content in the People and Sound section, and entries in the Audio Gallery are also available. Check out updated material under *How do marine animals hear sounds?* under Animals and Sound.
http://www.dosits.org/

Discovery of Sound in the Sea
The Discovery of Sound in the Sea web site has been developed by the University of Rhode Island's Office of Marine Programs in partnership with Marine Acoustics, Inc. This website introduces users to the science and uses of sound in the sea. The audio gallery allows users to listen to underwater sounds created by marine animals, human activities, and natural phenomena such as lightning, earthquakes, and rain. Offerings include video interviews with scientists, scientific investigations, and a section for teachers with resources and classroom activities.
http://www.dosits.org/

Disneynature's Oceans
Disneynature's big-screen movie, Oceans, will be released on Earth Day, April 22, 2010. Disney is teaming up with The Nature Conservancy for the initiative, See OCEANS, Save Oceans, with a portion of each ticket sold for the film's opening week (April 22-28, 2010) going to help establish new marine protected areas in the Bahamas. An Educational Activity Guide and Educator's Guide are available for downloading from the website.
http://disney.go.com/disneynature/oceans/

Distance Education Clearinghouse
The University of Wisconsin System offers the Distance Education Clearinghouse, a comprehensive website bringing together distance education information from Wisconsin, national, and international sources. The website hosts general information about distance education, research findings on its effectiveness, pedagogical support for teachers, financial aid information, and links to many additional websites and resources.
http://www.uwex.edu/disted/home.html

Dive and Discover Expedition 15: Dark Life at Deep-Sea Vents
Join scientists from the Woods Hole Oceanographic Institution and partners for the *Dive and Discover Expedition 15: Dark Life at Deep-Sea Vents*, January 2-21, 2014. This website follows the action aboard the research vessel *Atlantis* via daily updates, photos, and videos. Students can email questions and get personal responses from researchers and crew members. Check out the classroom activities, video interview, and more.
http://divediscover.whoi.edu/

Dive and Discover in the Gulf of Mexico
Join Dive and Discover's online expedition as the deep-sea submersibles Alvin and Sentry explore the bottom of the Gulf of Mexico. The website will offer daily posts from Alvin's support ship, R/V *Atlantis*, that report on research at sea, life aboard ship, and news of what the scientists find each day. Students can also delve deeper into topics related to life in the ocean and email questions to researchers on board. The expedition starts December 6, 2010. The website offers classroom activities, hot topics, and more.

http://www.divediscover.whoi.edu/

Dive In To Earth Day
Dive In To Earth Day has been broadening people's knowledge of Earth Day to include the education and conservation of our planet's aquatic ecosystems. It will be celebrated throughout the week of Earth Day, April 22. Visit the website for inspiration, tools, information, and to register your event for a global impact. Activities that make conservation fun and accessible while having a real impact include beach and underwater clean-ups, educational workshops, fish and reef surveys, mooring buoy installations, among many others.
http://www.coralreefalliance.org/divein/

Dive In To Earth Day
Dive In To Earth Day offers you the opportunity to take a stand for the protection of coral reefs, and raise global awareness about pressing conservation issues. Organize a beach or underwater cleanup, host an educational slideshow or film, conduct a fish survey, or raise funds for a marine protected area, by "Diving In" this Earth Day. 2003's event garnered 270 activities, helping protect coral reefs and aquatic ecosystems in 58 countries and territories around the world. Register your event online at http://fmpro.coralreefalliance.org/divein/reg_1.htm.
http://www.coralreefalliance.org/divein/ .

Dive Into Your Sanctuaries
The National Marine Sanctuaries website now includes a section covering diving in the sanctuaries. It features a map with mouseover pop-ups providing sanctuary specific details, information on shipwreck diving, and details covering different sanctuary habitats.
http://sanctuaries.noaa.gov/visit/diving.html

DiveSelector
The intention of DiveSelector.com is to compare diving destinations based on specific criteria in the hopes that divers could select destinations where the quality is highest and result in a shift in diver demand, causing destinations to make extra effort to protect their environment as a way to attract divers. Current data is based upon limited survey results; fill out a survey about your latest diving trips.
http://diveselector.com/

Diversity: A Nature & Scientific American Special Issue
This special issue, a partnership between Nature and Scientific American, explores links between diversity and good research.
http://www.nature.com/news/diversity-1.15913

Diversity, Systematics, and Connectivity of Vulnerable Reef Ecosystems (DISCOVRE)
This 4-year multidisciplinary research program will focus on understanding the physical oceanography, biology, ecology, genetic connectivity, and trophodynamics of deep coral environments in the Gulf of Mexico, both within natural and artificial sites. Read the daily logs from the first cruise, review relevant publications, and more. The second cruise, Lophelia II, is featured on a NOAA website.
http://fl.biology.usgs.gov/DISCOVRE/index.html

Diving Deeper Podcasts
NOAA's National Ocean Service offers Diving Deeper, a bi-weekly audio podcast featuring discussions with NOS scientists on a wide variety of ocean topics. Current topics include marine debris, MPAs, and eutrophication.
http://oceanservice.noaa.gov/podcast.html#dd

DIY Lake Science App
DIY Lake Science is a free app for iPhones and iPads that allows families and educators to investigate lakes and other freshwater ecosystems at home, at school, or anywhere. It offers outdoor and indoor hands-on activities, videos, and more. Each activity includes material lists, step-by-step instructions, and detailed explanations.
http://www.lawrencehallofscience.org/do_science_now/diy_lake_science

DLESE Teaching Boxes
Teaching boxes from the Digital Library of Earth System Education are classroom-ready instructional units created by collaboration between teachers, scientists, and designers. The Teaching Boxes contain materials that model scientific inquiry, allowing teachers to build classroom experiences around data collection and analysis from multiple lines of evidence, while engaging students in the process of science, focusing on gathering and analyzing scientific evidence.
http://www.teachingboxes.org/

DLIST ASCLME
Widen your perspectives: DLIST ASCLME (Agulhas and Somali Current Large Marine Ecosystem) was created to help provide access to information for stakeholders who have an interest in the welfare of Western Indian Ocean, its coastal areas, and local communities.
http://www.dlist-asclme.org/

Do L.A.P.'s for Michigan
The Michigan Department of Natural Resources provides its Millennium Education Project – great state, great parks, great history – L.A.P.'s (Learn from the past, Appreciate the present, and Preserve our outdoor heritage). Michigan fourth grade teachers and students have fun as they learn and explore through the L.A.P.'s characters. The website features a variety of resources, games, links, and a virtual tour of a different park each month.
http://www.dnr.state.mi.us/edu/DNRIntroPages/DNRlaps.html

Dog-Eared Publications and Social Ecology Press
Dog-Eared Publications aims to turn young readers into environmentally aware citizens and foster a love of science and nature in the new generation by capturing their interest and engaging them with interactive games, mysteries, puzzles, and stories. Social Ecology Press publishes accounts of human behavior, natural resources, and the environment. Their goal is to provide affordable books for classroom adoption and the natural resource professional community.
http://www.dog-eared.com
http://www.dog-eared.com/socialecologypress/index.php

Doing Good Together
Doing Good Together: 101 Easy, Meaningful Service Projects for Families, Schools and Communities, addresses family volunteerism with hands-on service projects focused on

promoting literacy, helping the environment, and more. The website offers a free look inside at various pages, including the Table of Contents.
http://www.amazon.com/Doing-Good-Together-Meaningful-Communities/dp/1575423545

Doing Science: The Process of Scientific Inquiry
This website helps students understand the basics of scientific inquiry. This NIH curriculum supplement series for grades 6-8 offers lessons, a teacher's guide, and more to help guide students about scientific inquiry. Activities include distinguishing questions that can be tested by a scientific investigation from those that cannot and participating in a computer-based scientific investigation as members of a fictitious community health department.
http://science.education.nih.gov/supplements/nih6/Inquiry/default.htm

Doing What Works
Doing What Works is a new website from the Department of Education dedicated to helping educators identify and make use of effective teaching practices. Doing What Works contains practice guides developed by the Department's Institute for Education Sciences that evaluate research on the effectiveness of teaching practices described in the guides. Though the website currently only hosts information about English Language Learners, Math and Science will be included at a later date.
http://dww.ed.gov/index.cfm?

Dolphins in the Classroom
Bring your students to Dolphin Research Center in Florida. Thanks to webcam and Internet technology, you and your classroom can watch and listen to live or pre-taped demonstrations and engage in question and answer sessions with experts in the fields of marine mammal care, training, and research. Different options are available.
http://www.dolphins.org/distance_learning.php

DonorsChoose
Teachers ask. People choose. Students learn. DonorsChoose is a simple way to provide students in need with resources that our public school often lacks. Here, teachers submit ideas for materials or experiences that their students need to learn. Individuals can choose a project and make it a classroom reality.
http://www.donorschoose.org/

Don't Even Sink about It
Don't Even Sink about It utilizes two components of ocean observing systems, AUVs and buoys, to explore density and how it affects the buoyancy of different objects. Don't Even Sink about It also uses the M/V Ocean Hope to discuss ship character. Students will evaluate archived and real-time water depth data from the Chesapeake Bay, as well as density plots of continental shelf water off of New Jersey to determine if commercial cargo ships can safely pass without running aground or other major shipping incidents.
http://www.marine-ed.org/bridge/index_archive1207.html

DoRight Enterprises
DoRight Enterprises™ is a youth-run consulting firm. This interdisciplinary curricular program "employs" students as consultants in a not-for-profit consulting firm run by the teacher. Students acquire environmental and economic knowledge and skills needed to

offer their expertise as consultants to help their local businesses, hospitals, schools, and others reduce operating costs, raise profits, and reduce environmental impact.
http://scottbeall.com/dorightsummary.htm

Down Under, Out Yonder Highlights
The 13th annual Down Under, Out Yonder (DUOY) Advanced Educators Cruise brought 18 teachers to the reef for a three-day trip on a live-aboard dive boat. DUOY is a joint venture between the Gulf of Mexico Foundation and the Flower Garden Banks National Marine Sanctuary, with funding from ConocoPhillips. Photographer Franklin Viola documented this year's trip in photos, along with a brief log and links to more information.
http://gulfmex.org/gallery/duoy2007/index.html

Dr. E's Science Page PowerPoints®
From La Canada (California) High School's Dr. Mark Ewoldsen and students in the Advanced Placement Environmental Science class, Dr. E's Science Page provides PowerPoint® presentations on a variety of subjects, including biomes, coral reefs, endangered species, ocean pollution, and more.
http://www.lcusd.net/lchs/mewoldsen/PowerPoint.htm

DragonflyTV
Twin Cities Public Television hosts DragonflyTV with a diverse group of pre-adolescents as hosts and experimenters. The website features include scientists reporting on their research and careers, science videos, games, and more.
http://pbskids.org/dragonflytv/index.html

Drawing from Nature
The *Drawing from Nature* series runs regularly as the lead story in the Sunday edition of the *Los Angeles Times Kids Reading Room Page.* Each article in the series introduces children to a different subject from nature and a related art technique. This project might be able to serve as a blueprint for an ocean-themed related series in a newspaper near you.
http://nrs.ucop.edu/Reserves/stunt/news/LALivingadpic.html

Drink it Up
This online educational environmental project encourages global participation for schools to learn about their local drinking water. Lessons for the project include how to test your drinking water, the water cycle, and what makes up a watershed. Participating classes are encouraged to test their drinking water, and to post their results to the database for others to use as real data. Classes are encouraged to submit a group project as a web page about their research complete with pictures, maps and diagrams.
http://www.millennium.scps.k12.fl.us/staffpages/ShawR/drinkitup/waterover.html

Drinkable Book
WaterisLife sponsors the Drinkable Book, a sanitation manual with pages that double as both water filters and useful information about sanitation in both English and the local language. The book's pages contain technology which can decrease the bacteria count of contaminated drinking water by more than 99.9 percent. Each page can produce up to 60 days of safe drinking water, while an entire book can provide up to four year's worth.

http://www.dezeen.com/2014/05/12/drinkable-book-sanitation-manual-water-filters-brian-gartside/

Drought Communication Toolkit
This toolkit from the CDC will help users keep the public informed of what drought could mean for their health, from immediate short-term health effects to chronic and debilitating impacts. The website offers resources on how to explain drought preparedness and safety to a variety of audiences, including homeowners, vulnerable populations, and industry leaders.
http://www.cdc.gov/nceh/drought/toolkit/default.htm

Drought Planning Toolbox
The Colorado Water Conservation Board offers the Drought Planning Toolbox, created to assist state and municipal planners. Although some resources are Colorado specific, there's still plenty of information to help others prepare for drought, including national drought monitoring resources, local drought planning guidance, climate change information, and financial assistance available for drought response.
http://cwcb.state.co.us/technical-resources/drought-planning-toolbox/Pages/main.aspx

Drought Impacts to Critical Infrastructure
This report by the Department of Homeland Security Office of Cyber and Infrastructure Analysis examines the impacts of current drought conditions on critical infrastructure systems such as water and wastewater, energy, food, and agriculture. The report outlines the effects now visible on systems and planning and policy measures to address them.
http://content.govdelivery.com/attachments/USDHSFACIR/2015/04/30/file_attachments/386553/Drought%2BImpacts%2Bto%2BCritical%2BInfrastructure.pdf

Drought Portal
The U.S. Drought Portal is an interagency portal providing critical and updated information on drought to stakeholders. It was created to provide comprehensive information on emerging and ongoing droughts, and to enhance the nation's drought preparedness. The portal is an integral element of the National Integrated Drought Information System (NIDIS). The education section links to selected resources, including lesson plans in English and Spanish, along with general information.
http://drought.gov/

Drought Risk Atlas
The National Drought Mitigation Center Drought Atlas project is intended to provide a wide range of decision makers with historical drought information and a web-based tool to visualize and assess their risk to drought. Check out the map viewer, and click to expand the drought monitor to view historical data.
http://droughtatlas.unl.edu/

Ducks in the Flow
Ducks in the Flow: Resources about Surface Ocean Currents for the Upper Elementary Classroom, intended for grades 3-5, includes a storybook and three classroom activities. In the storybook, the three kids work collaboratively to explore and investigate surface currents found in the ocean and the Great Lakes while learning about the journey of a seafaring plastic duck. Three hands-on activities for the classroom further explore the science content and provide instruction in basic science process skills.

http://www.windows.ucar.edu/tour/link=/teacher_resources/ocean_education/currents_main.html

Ducks Unlimited and Project WET Join Forces to Highlight World Wetlands Day
Ducks Unlimited and Project WET (Water Education for Teachers) announce a new education partnership to celebrate World Wetlands Day, to benefit water, wetlands, wildlife, and people across North America. The partnership harnesses the power of both organizations to educate about the importance of wetlands and water resources. The partnership is also part of Ducks Unlimited's launch of its new wetlands education program, called Project Webfoot.
http://www.ducks.org/News/WET_Partnership.asp

Ducks Unlimited Wetland Curriculum
Ducks Unlimited has developed three units in a wetland ecosystems series. Each unit consists of an educator's guide and accompanying student journal. Teachers guides are also available for grades 4-6. The units include experiments and activities that provide a base to build a complete wetland curriculum. Additional materials and activities for kids are also available.
http://www.greenwing.org/dueducator/noncssdu_educator.html

The Dune Book
North Carolina Sea Grant offers a comprehensive book on sand dunes. This publication describes the benefits of dunes and dune vegetation, as well as the best dune management practices along developed shorelines where people, buildings and roads are already in place. It also describes how to select and plant the best dune grasses for the North Carolina coast and provides tips and colorful illustrations on the most common dune species.
http://www.vims.edu/bridge/index_geology.html .

Dune Habitat Restoration Adventure Program - Texas
Artist Boat, with funding from the National Fish & Wildlife Foundation. offers this opportunity for students and teachers of grades 4-12 to engage as coastal stewards through planting a variety of native dune plants along the upper Texas coast on Follet's and Galveston Islands. There are 77 events available and priority will be given to schools who can participate as early as November and December, 2011.
http://www.artistboat.org/habitat-restoration.html

Dune Restoration - Texas
Artist Boat and partners will lead three upcoming community outreach dune restoration events on Galveston Island, Texas, February 3, February 18, and March 4, 2012. See the website for details.
http://www.artistboat.org/

Dutch Caribbean Nature Alliance
This website from the Dutch Caribbean Nature Alliance offers an Internet resource for both professionals and the general public on issues of biodiversity and conservation within the Dutch Caribbean, including the islands of Aruba, Bonaire, Curaçao, Saba, St Eustatius and St Maarten. The website currently features information on protected areas, habitats, ecosystems, and endemic, endangered and vulnerable species; details about ongoing projects; a sea turtle tracking programme; and more.
www.DCNAnature.org

Dynamic Bird Migration Maps
eBird, a joint project of the Cornell Lab and Audubon, with the help of bird watchers and high-performance computing, has released fifteen dynamic maps capturing the ebb and flow of bird migration. See the maps in action, and check out the other resources on the website, including links to games, news, and more.
http://ebird.org/content/ebird/news/ebird-animated-occurrence-maps

Dynamic Earth
The Smithsonian Museum of Natural History brings a brief introduction into the physical science of the history of Earth alive in a unique fashion with this website. Sections include Gems and Minerals, Rocks and Mining, Plate Tectonics and Volcanoes, and the Solar System. The website can be viewed either as multimedia or in a print version.
http://www.mnh.si.edu/earth/main_frames.html

Dynamic Earth Resources
NSTA's Science Class offers a web page with a list of resources for studying The Dynamic Earth.
http://science.nsta.org/enewsletter/2011-12/web_high.htm?utm_source=enewsletter&utm_medium=email&utm_campaign=HSSciClassDecember2011

e-Learning for Kids
This website offers more than 200 free, interactive digital science lessons addressing a range of topics and disciplines. The materials can be browsed by grade and searched by key word.
http://www.e-learningforkids.org/science/

Early Childhood Hands-On Science
The Miami Science Museum has a curriculum for elementary school students designed to intertwine conceptual learning goals with teaching process skills and practices needed to do science. The curriculum consists of nine thematic units focused on Life, Earth, and Physical Science. Each unit contains an overview, teacher back-ground, four lessons, and twelve integration activities. Download the brochure to review the materials.
http://www.miamisci.org/echos_downloads/Miami_Science_Museum_2012_ECHOS_Brochure.pdf

Early Warning and Environmental Monitoring Program
The Early Warning and Environmental Monitoring program encompasses a broad spectrum of scientific endeavors operating at national, regional, and international scales. Project activities support investigations in the areas of climate change, natural resource management, environmental change detection, food security monitoring, water resource assessments, and hazard identification/mitigation. FEWS NET is a Famine Early Warning Systems Network; other projects monitor drought and more.
http://earlywarning.usgs.gov/fews/index.php

Earth Alerts
Earth Alerts is a free, downloadable Windows-based application that provides alert notifications, reports, and imagery on many types of natural phenomenon that are occurring real-time both worldwide as well as in specific locations within the United

States, including Guam, Puerto Rico, and the U.S. Virgin Islands. You can specify the activity types and locations of interest for notification.
http://earthalerts.manyjourneys.com/

Earth and Environmental Science: Research Overview
This website from the National Science Foundation examines questions that scientists are pursuing, including: What part do we play in earth's changing climate? What can rock layers tell us about earth's history? How can we understand the forces that lead to earthquakes and volcanoes? How do long-term changes affect earth's ecosystems? The website includes links to classroom and other resources related to the current research topics.
http://www.nsf.gov/news/overviews/earth-environ/index.jsp

Earth as Art: A Landsat Perspective
This exhibition from the Library of Congress showcases Landsat 7 images, from the collection of Landsat photographs held in the Geography and Map Division, which have been selected for aesthetic rather than scientific value. These images are actual pictures of the Earth, created by printing visible and infrared data in colors visible to the human eye. Band combinations and colors were chosen to optimize their dramatic appearance. Included are striking photos of Aleutian clouds, the Everglades, the Ganges River delta.
http://www.loc.gov/exhibits/earthasart/ .

Earth - The Biography
Earth - The Biography, from the National Geographic channel, examines how the earth was formed, and how carbon dioxide emissions are changing major ecosystems and the possible impacts on the planet. The program segments are Atmosphere, Oceans, Volcanoes, Ice, and Rare planet. A companion book to this series is also available for purchase.
http://channel.nationalgeographic.com/series/earth-the-biography/all/00#tab-Overview
http://shop.nationalgeographic.com/product/1062/4260/114.html

Earth Is Blue Campaign
NOAA's Office of National Marine Sanctuaries has launched the Earth Is Blue social media campaign to share the beauty and wonder of the sanctuaries with the world through powerful photos and video imagery. The sanctuary's Instagram account will share a new photo every day from across the National Marine Sanctuary System. In addition, staff will produce a video each week highlighting the resources, places, and people that make sanctuaries worth protecting.
http://sanctuaries.noaa.gov/earthisblue.html
http://instagram.com/noaasanctuaries

Earth Climate Course
NASA's Goddard Institute for Space Studies offers educators and students a website to learn about how a planet's climate is determined, a system of human and natural processes that result in changes over various space and time scales. Students seek answers and consensus by experimenting with physical and computer models, collecting and analyzing their own measurements, and conducting comparisons with real world data from satellites and ground-based observations. The website includes teacher notes, student activities, and data sets.
http://icp.giss.nasa.gov/education/modules/eccm/

Earth Day
Celebrate Earth Day on April 22. Check out happenings around your area or register your program. The website offers "Earth Day in a Box" under the Resources link. Check out the education resources, including the Green Your School Guide, Student Activist Toolkit, and more. Earth Day 2014's focus is on Green Cities.
http://ww2.earthday.net/~earthday/
http://www.earthday.net/earthday2009
http://www.earthday.gov/
http://www.earthday.org/education
http://www.earthday.org/greencities/

Earth Day Celebrations
Learn what you can do to help our ocean planet while celebrating Earth Day, April 22. Events will be held throughout the county. Here's a brief sample.

- Aquarium of the Pacific, Long Beach, California, April 23-24, 2005. Join a weekend of family fun while learning simple, everyday tips to protect our environment. Visit booths from various organizations and participate in hands-on learning demonstrations. http://www.aquriumofpacific.org
- Florida Goliath Grouper Census, Panama City, Florida, March 19-April 22, 2005. Dive teams will be organized and will receive pre-dive briefings. http://www.earthday.net/programs/find/eventView.aspx?ID=3012
- "Earth Today" TV Show, South Carolina Educational TV, April 19, 2005. The student anchors interview adult experts on environmental topics. In addition to the 30-minute show, there are 21 lesson plans that relate to the different segments. http://www.earthday.net/programs/find/eventView.aspx?ID=2531
- EE-Link Earth Day Resources. http://eelink.net/eeactivities-earthday.html
- NSTA Earth Day Resources. http://science.nsta.org/nstaexpress/nstaexpress_2005_02_28_esteme.htm
- Earth Day Network, http://www.earthday.net/default.aspx, with links to the Educators Network and Environmental Jeopardy
- International Earth Day, http://www.earthsite.org/
- U.S. Government Earth Day Events and Information, http://www.earthday.gov/ (with links to taking action in your classroom)
- National Environmental Education Week, http://www.eeweek.org

Earth Exploration Toolbook
The Earth Exploration Toolbook is a collection of online Earth system science activities. Each chapter introduces one or more scientific data sets and analysis tools that enable users to explore some aspect of the Earth system. The toolbook is broken down into chapters, and each chapter further broken into sections for easier computer access. Chapters include Annotating Change in Satellite Images, Are Our Cities Warming the Earth?, Evidence for Plate Tectonics, and more.
http://serc.carleton.edu/eet/

Earth Force
The Earth Force approach combines community development with youth civic engagement, service-learning, and environmental education. The result is national and local networks of organizations that successfully engage youth in civic life. Check out the extensive list of resources, local stories, and more.
http://www.earthforce.org/

Earth: A Graphic Look at the State of the World
This website offers an integrated collection of charts and maps summarizing the conditions of the world's natural ecology and human cultures, their interactions, and their impact on one another. Topics include fresh water, fishing and aquaculture, and more. Sign up for the newsletter, check out the quiz, and more on this website.
http://www.theglobaleducationproject.org/earth/index.php

Earth From Above on the Web
Sponsored by UNESCO and Fuji Film, the *Earth from Above* project included a traveling exhibition that made its way across the United States. Photographer Yann Arthus-Bertrand documented many of the world's places and examined the effects of humans on the earth. This website allows users to view many of these photographs via an innovative interactive interface. Visit a mangrove forest in New Caledonia, motion graphics of the Planet Blue, and the Mark of Man. Netscape 6 is not supported.
http://home.fujifilm.com/efa/

Earth Gauge
Earth Gauge® is a free information service designed to make it easy to talk about links between weather and environment. Originally developed for weathercasters, the information is also available to the educators, students, and the general public. Broadcast meteorologists from across the United States have contributed videos explaining the ocean's role in weather in their regions and posted them on the website. Note that material from the website is also available in Spanish.
http://www.earthgauge.net/

Earth Gauge Kids
The Earth Gauge Kids website is designed for students in grades 5-8 and focuses on a different weather/environment theme each month. Students can find an interactive quiz, activity ideas, fun facts, and more.
http://www.earthgauge.net/kids/index

Earth Learning Idea
Earth Learning Idea offers downloadable activities and suggested teaching strategies in Earth Science, Geology, Environmental Science, and Physical Geography. These resources require minimal equipment.
http://www.earthlearningidea.com/

EARTH Lesson Plans
Education and Research: Testing Hypotheses (EARTH), provides teachers with means for integrating real-time data with existing educational standards and tested curriculum in an interactive and engaging way. EARTH uses near-real-time data from ocean observatories to design and test outreach with the Internet as an interface to scientists, teachers, students, and the public. The website offers lesson plans, links to data, standards rubrics, and more.
http://www.mbari.org/earth

Earth Learning Idea
The Earth Learning Idea website offers Earth science instruction ideas. Each activity is designed to maximize student participation, learning, and enjoyment while minimizing

cost. Strategies promote interactive teaching and students' investigational and thinking skills. Activities are posted in English, Spanish, and more.
http://www.earthlearningidea.com/

Earth Matters: Studies for Our Global Future
The Population Connection is updating the secondary curriculum, Earth Matters: Studies for Our Global Future, and offers the second edition free for downloading on its website, including all readings and activities. Units include Population Dynamics, Climate Change, Water Resources, and more.
http://www.populationeducation.org/index.php?option=com_content&view=article&id=443&Itemid=2

Earth Newswire Social Networking Site
Earth Newswire is a new social networking website for people interested in environmental science, ecology, and conservation issues to connect with one another and share news and information. The site features generalized forums and also allows members to create specialized discussion groups.
http://earthnewswire.ning.com/

Earth: The Operators' Manual
This PBS Special premieres nationwide at 10pm EST on April 10, 2011. *EARTH: The Operators' Manual* is a three-part series, targeted for PBS TV, a website, and on-site events at science centers across America. Its mission is to use Earth science to explain our planet's climate history and to describe sustainable energy options. Check back for the updated project website, or follow along on facebook.
http://cleanet.org/cln/ccep/earththe_operat.html
http://www.facebook.com/pages/EARTH-The-Operators-Manual/118133928201961
http://earththeoperatorsmanual.com/for_educators

Earth Partnership for Schools
The Earth Partnership Program, from the University of Wisconsin-Madison Arboretum, focuses on ecological restoration as a way of establishing a positive relationship between people and the land. The program assists teachers in establishing restoration projects on school sites and providing the tools for building a curriculum that incorporates restoration into almost any subject area. Check out the resources under *Tools for Teachers*.
http://uwarboretum.org/eps/

Earth Portal
Earth Portal is a free resource for timely, objective, science-based information about the environment built by a global community of environmental experts: educators, physical, life, and social scientists, scholars, and professionals who have joined together to communicate to the world. The Earth Portal is being created and governed by individuals and organizations, with attribution and expert review for accuracy. Earth Portal includes *Encyclopedia of Earth, Earth News*, *Earth Forum*, and *Environment in Focus*. Check out the Hot Topics for Marine Ecology.
http://www.earthportal.org/

Earth Preservers
Earth Preservers is an environmental news and information website for kids that relates the environment to a wide range of current events and topics. Resources include short

films and documentaries, interactive quizzes, classroom resources, poll questions, and a monthly newsletter. Check this out for your students.
http://www.earthpreservers.com/storage/home/index.html

Earth Reference Data and Models
EarthRef.org is a website for Earth Science reference data and models. It offers links to databases, tools, publications, and more, including ERESE: Enduring Resources for Earth Science Education. Check out the expeditions, Scripps Classroom Connection project, seamount biogeosciences network, and much more. It appears to host information that hasn't been updated lately, but retains good links.
http://earthref.org/

Earth Revealed
Annenberg Media presents *Earth Revealed*, a video instructional series for high school and college which explores earth's continuing evolution, scientific theories, and human impacts. Upcoming broadcasts include weathering and soils; running water; waves, beaches and coasts, and more.
http://www.learner.org/channel/series78.html

Earth Science Curricula
The American Geological Institute offers geoscience education products and services for students and teachers. *EarthComm: Earth System Science in the Community* is for high school students. For middle school students, *IES: Investigating Earth Systems* emphasizes inquiry. Elementary students have *K-5 GeoSource*, with online professional development for K-5 teachers. The website features lesson plans, classroom activities, teaching resource links, and more. The *Environmental Awareness Serie*s addresses major societal concerns and illuminates the complexity and interconnection of the natural systems, with a balanced review of key issues and topics.
http://www.earthsciweek.org/forteachers/bestineducation.html

Earth Science Education Catalog
NASA's Earth Science Education Program offers a diverse array of programs and resources. The complete listing of earth science education programs, products and resources, along with NASA-wide resources for educators, is provided in this online catalog. The Elementary and Secondary, Higher Education, and Informal Education sections feature regional and national programs. Products and Resources identifies earth science products and resources for these three educational communities.
http://science.hq.nasa.gov/education/catalog/index.html

Earth Science Literacy Initiative
The Earth Science Literacy Initiative, funded by the National Science Foundation, has gathered and codified the underlying understandings of Earth sciences into a succinct document, which establishes the "Big Ideas" and supporting concepts that all Americans should know about Earth sciences. The resulting Earth Science Literacy framework will also become part of the foundation of a larger geoscience Earth Systems Literacy effort, along with similar documents from the Oceans, Atmospheres and Climate communities.
http://www.earthscienceliteracy.org/

Earth Science Visualizations
Created by staff members at the department of earth science at the University of California, Santa Barbara, the Educational Multimedia Visualization Center website

contains interactive animations and visualization tools that can be used in the classroom to demonstrate various geological processes. Contents include global tectonics, regional plate tectonics, Ice Age earth, and more.
http://emvc.geol.ucsb.edu/downloads.php

Earth Science Week 2014
This year, Earth Science Week, October 12-18, 2014, celebrates Earth's Connected Systems – from land to sea, ice to sky, and everything living in between. Check out the educator resources, order a toolkit, and more. Be sure to also check out the links from NASA's Earth Science Week website, including the Know Your Earth quiz, the All About Earth storybook, and much more .
http://www.earthsciweek.org/
http://nasaesw.strategies.org/educational-resources/

Earth Science Week 2013 Toolkits
The American Geosciences Institute Earth Science Week 2013 Toolkit contains educational materials that support this year's theme, *Mapping Our World*. Earth Science Week 2013 will be celebrated October 13-19, 2013. Plan an event, check out the resources, sign up for the newsletter, and more in preparation for this yearly educational celebration.
http://www.earthsciweek.org/

Earth Science Week
Earth Science Week will be held October 10-16, 2010, aimed at encouraging people everywhere to explore the natural world and learn about the geosciences. The theme for 2010 is Exploring Energy. October 14-20. 2012, encourages people to explore the natural world and learn about the geosciences. The theme for 2012 is *Discovering Careers in the Earth Science.* The website hosts links to a variety of educational resources, images, and more. Check out the photo, visual arts, and essay contests.
http://www.earthsciweek.org/

Earth Science Week
Earth Science Week is October 11-17, 2009. The 2009 Earth Science Week Toolkit is now available. The kit includes an activity calendar, posters, resources, activities, a field notebook, and student handouts. Materials cover a range of earth science topics including National Parks, GIS technology, volcanoes and the ecological impacts of climate change.
http://www.earthsciweek.org/materials/index.html

Earth Science Week
The American Geological Institute, in cooperation with NASA, USGS, National Park Service, and many others, supports Earth Science Week 2008, *No Child Left Inside*, October 12-18, 2008. Earth Science Week 2008 encourages young people to learn about the geosciences by getting away from the television, off the computer, and out of doors. Local groups, educators, and interested individuals organize celebratory events.
http://www.earthsciweek.org/

Earth Science Week International Polar Year (IPY) Videoconference
Middle and high school students and teachers are invited to participate in *The Science of IPY*, an interactive one-hour videoconference hosted by local science centers on October 19, 2007. Scientists took participants on a virtual tour of Earth's polar regions

and explored some of the key questions that scientists are trying to answer about how the poles are changing. Participants convened at select science centers in the eastern U.S., the United Kingdom, and France.
http://www.earthsciweek.org/newsletter/July2007.html

Earth Science Week Toolkit
Coordinated by the American Geological Institute, Earth Science Week, October 14-20, 2007, promotes an understanding and appreciation of the earth sciences. The institute offers *The Pulse of Earth Science* toolkit with a wide array of resources, including its calendar filled with activities and geoscientific dates, NASA's *Exploring Ice* CD-ROM, and more. The website includes links to downloadable lessons, career information, and Earth Science Week events and contests.
http://www.earthsciweek.org/materials/index.html

Earth Science World Image Bank
The Earth Science World Image Bank from the American Geosciences Institute offers quality geoscience images to the public, educators, and the geoscience community. Categories include weather, lakes, volcanoes, and more.
http://www.earthscienceworld.org/imagebank/index.html

Earth Sciences Resources
Intute: Earth Sciences offers free access to Internet resources for students, researchers, and practitioners in the physical sciences, specifically in astronomy, chemistry, earth sciences, materials science, physics, and general science. Available information includes lecture notes, text book chapters, tutorials, and more. While the website is no longer being updated, it offers links to many useful resources. Categories include Oceanography, glaciology, and more.
http://www.intute.ac.uk/earthsciences/

Earth Smarts
Earth Smarts aims to explore essential ecoliteracy in a transdisciplinary manner, designed to be practical, apolitical, and adaptable across cultures and bioregions.
http://www.earthsmarts.info/

Earth and Sky Radio
Earth and Sky radio series offers short daily radio programs about science and nature, available on most National Public Radio (NPR) stations and the Armed Forces radio network. You can also listen to the logged broadcasts on the website. Recent segments focused on coral reefs and climate change.
http://www.earthsky.org/

Earth & Sky International Polar Year Resources
On this website, Earth & Sky editors have compiled radio programs, podcasts, and a photo gallery with content related to polar science to help celebrate the International Polar Year. They will continue to update this website with relevant interviews and sessions with polar scientists.
http://www.earthsky.org/article/international-polar-year

Earth & Space Systems Science - Online
The Virtual High School offers Earth and Space Systems Science aligned with the Next Generation Science Standards. Students engage in a series of inquiry-based and

investigative activities through the use of science datasets, visualizations, animations, interactives, and modeling activities. Students can take the course as an individual student or as part of an entire class.
http://thevhs.org/earthscience

Earth System Monitor
The National Oceanographic Data Center's (NODC) Earth System Monitor will now be published online semi-annually. The free publication reports on NOAA environmental data and information programs, projects, and activities. Visit the website to view online issues or to be automatically notified by RSS feed.
http://www.nodc.noaa.gov/General/NODCPubs/ESM/esm.html

Earth System Science
PBS's Education Collections offer relevant online resources related to specific NOVA programs. NOVA's Earth system science collection highlights important Earth processes through standards-based media resources. The website offers free access to the full program of Earth From Space, video clips, and other multimedia.
http://www.pbs.org/wgbh/nova/education/earth/earth-system-science-collection.html

Earth System Science Education Alliance
The Earth System Science Education Alliance delivers a student-centered teaching model for geoscience education to university faculty, as well as pre-service and in-service middle-high school teachers. Their website hosts a listing of participating institutions along with upcoming courses and contact information. In addition, the resources section hosts links to lessons on climate, oceans, polar regions, and more. This website is well organized and easy to navigate.
http://essea.strategies.org/index.aspx

EarthCache Educator's Guide
EarthCache combines global positioning system technology with outdoor field experiences. Teachers can learn how to create an EarthCache, direct students to create one, or use existing EarthCaches in the classroom. The website offers lesson plans and links to additional EarthCache sites for teachers.
http://rock.geosociety.org/Earthcache_Lessons/

EarthCaching for Teachers
EarthCaching is a variation of geocaching with an educational dimension to the activity. When you visit an EarthCache, you learn something special about Earth science, the geology of the location, or how the Earth's resources and environment are managed there. EarthCaching has been developed by the Geological Society of America and partners in the geocaching community. The website includes a teachers guide, links to lesson plans, and more.
http://www.geosociety.org/Earthcache_Lessons/

EarthCare
This resource features online stories about conservation, earth and ocean stewardship, ecosystems, and more. It showcases the Earth & Sky radio spots, along with links for more information.
http://www.earthsky.org/shows/earthcare .

EarthEcho Expedition: Into the Dead Zone
From September 3-13, 2013, Philippe Cousteau will lead a team of students, scientists, and community leaders on an expedition through the District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia, and New York. Along the way they will profile young people who are tackling the causes of dead zones and creating solutions in communities throughout the watershed. Sign up to follow along with the expedition.
http://www.earthecho.org/programs/earthecho-expeditions/

EarthKAM
EarthKAM is a NASA-sponsored project that provides photographs of Earth taken from the space shuttle and the international space station. Check out the photo galleries and upcoming missions.
https://earthkam.ucsd.edu/

EarthLabs
EarthLabs: A National Model for Earth Science Lab Courses is another well-designed project from the Science Education Resource Center (SERC) at Carleton College. These online units for a high school Earth science lab course are scientifically rigorous and quantitative. The units cover Corals, Drought, Fisheries, and more and consist of online and laboratory experiments, reading appropriate primary literature, and conducting web research.
http://serc.carleton.edu/earthlabs/index.html
http://serc.carleton.edu/teachearth/index.html

Earthman Project
The Earthman Project comes from a nonprofit organization which uses music, the arts, and technology to inspire people to protect the environment. The Climate Crisis Jam online video is a musical message about global warming offered up in easy rap style. Additional music includes the Earthman Blues and River of Grass. The website also links to lesson plans and additional information.
http://www.earthman.tv/2004/index.html

EarthNow: Monthly Climate Digest Videos and Highlights
Each month, the EarthNow blog provides a brief, narrated video of climate highlights from the previous month, based on the National Climatic Data Center's monthly global analysis. Along with large datasets for display on Science on a Sphere exhibits, all feature stories and Climate Digests are available as videos that can be viewed on computers or mobile devices. There are also easy-to-understand maps and more, to help visitors understand these model predictions.
http://sphere.ssec.wisc.edu/

earthOCEAN.tv
earthOCEAN.tv is an online channel about the marine environment. They produce educational videos from the field documenting environmental issues, scientific research, and conservation efforts around the globe. All videos programs are 10-20 minutes in duration and are freely distributed online in a number of formats through their website. There are also teacher's guides and fact sheets, including Disappearing Dolphins, Southern Right Whales of Argentina, and more.
http://www.earthocean.tv

EarthPulse: A Visual Guide to Global Trends
The interactive website, *EarthPulse: A Visual Guide to Global Trends*, from National Geographic Maps, analyzes our connected world with maps, diagrams, and imagery.
http://www.nationalgeographic.com/earthpulse/index.html

Earthquake Hazards Program
The United States Geological Survey's (USGS) Earthquake Hazards Program offers information about earthquakes (past, present, and future), along with links to educational materials and other informative websites. The home page offers maps of earthquakes occurring within the past seven days in the U.S. and the world. The educator pages offer FAQ, a glossary, kids' activities, and many additional educational resources.
http://earthquake.usgs.gov/earthquakes/

Earth's Future
The American Geophysical Union offers this new open access journal, *Earth's Future*, which will explore and foster interactions among the Earth and environmental sciences, ecology, economics, the health and social sciences, and more. Its mission is to focus on the Earth as an interactive, evolving system to help researchers, policy makers, and the public navigate the science.
http://onlinelibrary.wiley.com/journal/10.1002/%28ISSN%292328-4277

EarthTrends
EarthTrends is an online database maintained by the World Resources Institute that focuses on environmental, social, and economic trends. Research topics include Coastal and Marine Ecosystems, Climate and Atmosphere, and more. The website includes maps, information guides, a monthly newsletter, and other resources.
http://earthtrends.wri.org/#

EarthViewer
Howard Hughes Medical Institute offers the free EarthViewer App for iPads which allows users to explore the science of the Earth's history by scrolling through billions of years of continental development, changes in the atmosphere, temperature, biodiversity, and more.
https://itunes.apple.com/jo/app/earthviewer/id590208430?mt=8

Earthwatch Education Lessons
Earthwatch is a program that connects volunteers with opportunities to participate in field research. More than 50 lesson plans from educators who have participated in expeditions are available on the website. Lesson plan topic classifications include aquatic; terrestrial life and ecosystem; environmental issues; and community, culture, and history.
http://www.earthwatch.org/aboutus/education/edopp/lessonideas

EarthWire Marine
Provided by UNEP/GRID-Arendal, *EarthWire Marine* collects news from a wide range of media sources on the Internet; press releases and news from research organizations, environmental organizations and the public sector; and across a series of topics, all related to the marine environment.
http://www.earthwire.org/marine/

Eastern Caribbean Sustainable Finance
This site houses documents relating to the Sustainable Financing and Management of Eastern Caribbean Marine Ecosystems project, and serves as a forum for discussion among partners. Downloadable files include reports, PowerPoint presentations, and more.
http://conserveonline.org/workspaces/ecsusfinance/

EasyBib
The EasyBib website helps visitors create bibliographies in a variety of different citation styles, including MLA and APA. Users type in the item they need to cite, and EasyBib will provide the correct citation for each entry.
http://www.easybib.com/

Eat the Invaders
This website is aimed at fighting invasive species, one bite at a time. It offers information about invasive species, where to find them, and how to prepare them, along with recipes and more. Be sure to check out the article, Invasivore's Dilemma.
http://eattheinvaders.org/
http://www.outsideonline.com/outdoor-adventure/culinary/The-Invasivores-Dilemma.html

Eat Lionfish Campaign
NOAA's National Centers for Coastal Ocean Science is promoting the Eat Lionfish Campaign with a series of events designed to introduce chefs and the public to lionfish, a delectable invasive species. NOAA scientists researching the spread and impact of this non-native predator are encouraging a seafood market as a means of mitigating the species' impacts on reef ecosystems in Southeast U.S. and Caribbean waters.
http://www.facebook.com/pages/Mount-Pleasant-SC/Eat-the-Lionfish/283248658354

Ebbinghaus
Ebbinghaus allows users the opportunity to create flash cards and then review them at their leisure. The program also allows you to export "boxes" of cards to devices such as an iPod.
http://www.christian-kienle.de/Ebbinghaus/

eBird
The Cornell Lab of Ornithology and the National Audubon Society offer eBird, which provides a simple way for you to keep track of the birds you see anywhere in North America. Users can retrieve information on personal bird observations, access the entire historical database to find out what other eBirders are reporting from across North America, and more. . Scientists can use the cumulative eBird database to know more about the distributions and movement patterns of birds across the continent.
http://www.ebird.org/content/

EBM Tools Database
The EBM Tools Network offers an online database of ecosystem-based management tools (EBM). The database is designed to help practitioners find resources for projects and share information about their own work with the broader EBM community. The database contains interlinked information on tools, projects, resources, organizations, and practitioners.
http://www.ebmtoolsdatabase.org/

EBM Tools Network Updates
The Ecosystem-Basted Management (EBM) Tools Network offers a myriad of EBM tools and other resources on their website. Sign up for network updates, including news of upcoming demonstrations, professional development, and tools. The listserve also offers timely information for EBM and geospatial analysis professionals.
http://www.ebmtools.org/

Eco-Discover Center - Florida
The Eco-Discovery Center is operated by NOAA's Florida Keys National Marine Sanctuary, the National Park Service and the U.S. Fish and Wildlife Service. Located on the Key West, Florida waterfront, the free-admission Eco-Discovery Center showcases the underwater and upland habitats that characterize the Keys. Through interactive and touch-screen exhibits, audio, and video, visitors can explore the Keys' hardwood hammock, mangrove, patch reef, seagrass, deep shelf and Dry Tortugas environments.
http://floridakeys.noaa.gov/eco-discovery.html

Eco-Friendly Holiday Tips
According to Use Less Stuff, Americans throw away 25% more trash during the Thanksgiving to New Year's holiday period than any other time of year. The extra waste amounts to 25 million tons of garbage. Check out this webpage for links to tips for trimming your holiday wasteline.
http://www.eeingeorgia.org/net/content/go.aspx?s=15483.0.68.4863

ECO Journeys Program through Creative Education
Creative Education provides hands-on experiences to teachers and students that focus on the interrelations between people and their natural environment. Their goal is to inspire exploration, conservation, and the integration of broadened perspectives into local communities and daily lives. ECO (**E**xplore the **C**ulture and **O**cean) Journeys are field programs where students snorkel coral reefs and mangroves, assist researchers with fish surveys and aquaculture projects, work with a local fisherman, and much more.
www.creativeed.org/ECOhome/fieldprograms.htm

Eco-Schools
Eco-Schools is an internationally acclaimed program that provides a framework to help educators integrate sustainable principles throughout their schools and curriculum. The National Wildlife Federation is the lead for the initiative in K-12 schools in the United States. Through school-based action teams of students, administrators, educators and community volunteers, Eco-Schools combines effective "green" management of the school grounds, facilities, and the curriculum.
http://www.nwf.org/ecoschools/about.cfm

Eco-Schools USA Climate Change Connections
National Wildlife Federation's Eco-Schools USA and NASA offer this comprehensive high school curriculum using NASA Earth Observing Satellites data. Students use environmental audits, action planning, data collection, and more to experience the Earth system as a whole.
http://www.nwf.org/Eco-Schools-USA/Become-an-Eco-School/Pathways/Climate-Change/What-is-Climate-Change-Connections.aspx

Eco Student Blog
This blog is written by EPA employees, educators, and students and concerns all the things students are doing and can do to help the environment. It was launched to provide students with an outlet to expand on the environmental conversation with their peers. Check out the career advice and look through the archives.
http://blog.epa.gov/students/

ECOCEAN Whale Shark Photo-identification Library
The ECOCEAN Whale Shark Photo-identification Library is a visual database of whale shark encounters and of individually catalogued whale sharks. The library is maintained and used by marine biologists to collect and analyze whale shark encounter data to learn more about these fish. Submitters can assist with whale shark research through photos and sighting information. The website also includes background information about whale sharks, an interaction tutorial, and more.
http://www.whaleshark.org/index.jsp?langCode=en

EcoGarbage Board Game
ECOBASURA is a board game to help teach recycling, raw material recovery, profitable reduction of wastes, and the environmental renovation. Created in Colombia and endorsed by its Educational Ministry, it is adaptable to all languages and cultures. The website, along with pricing and ordering information, is available in English or Spanish.
http://www.ecobasura.com/

EcoGeek and EcoGeezers Series
This online monthly series from the Guana Tolomato Matanzas National Estuarine Research Reserve discusses how technology and environmental protection collide. Check the website or follow along on social media for information about upcoming episodes.
http://www.gtmnerr.org/EcoGeek-Series.php

EcoHealth 101: Environmental Change and Our Health
EcoHealth helps sort the science from the sound bites on five major topics including global warming. This website is aimed at grades 5-8 with lesson plans, video clips, links to more information, and more.
http://ecohealth101.org/

EcoLeaders
The National Wildlife Federation's Campus Ecology program's EcoLeaders Initiative is an online community for student environmental leaders to connect, share ideas, and earn recognition for their projects on campus or in the community.
http://www.nwfecoleaders.org/home

Ecolibary
The EcoLibrary is a source for free photographs useful for illustrating concepts in ecology, conservation biology, and the environment. The website currently contains several hundred annotated photographs that illustrate key concepts and as the site grows, maps, sounds, panoramas, and interactive exercises will be added. Check out the pictures associated with the themes under the Lessons section.
http://ecolibrary.cs.brandeis.edu/index.php

Ecological Impacts of Climate Change
The National Academies offers a downloadable booklet based on the 2009 report, *Ecological Impacts of Climate Change*. The booklet explains general themes about the ecological consequences of climate change and identifies examples of ecological changes across the United States. The website also offers downloadable and annotated Powerpoint presentation modules on ecological impacts, developed to assist educators in sharing information about the ecological impacts of climate change.
http://dels.nas.edu/climatechange/ecological-impacts.shtml

Ecology 180
Ecology 180 offers science delivered in three minutes or less. The website aims to offer viewers important and complex environmental issues in digestible bites. Check out This is Coral, the first of seven short animations on ocean acidification.
http://www.ecology180.com/

Ecology by Inquiry
NOAAA's Northwest Fisheries Science Center offers lessons designed to teach fundamental ecological principles using an inquiry-based approach to middle-school students. They cover a wide range of scientific skills and ecological concepts: quantitative versus qualitative observations, food webs, predators and prey, mapping, habitats and adaptations, watershed ecology, and much more.
http://www.nwfsc.noaa.gov/education/

Ecology Connections
Ecology Connections is a Canadian website dedicated to providing educators and public access to primary ecological research and education resources. The research and education connections are relevant to high school biology teachers, educators from non-formal education organizations, and public interested in learning more about the science of ecology. Information, professional development, curriculum, and links to career information are available.
http://www.ecologyconnections.ca/cgi-bin/index.php

Ecology Lab
Annenberg Media's Habitable Planet series offers an ecology lab with an ecology simulator, a glossary of relevant ecosystem terms, videos, an online textbook, and more.
http://www.learner.org/courses/envsci/interactives/ecology/

EcoMOBILE
EcoMOBILE (Ecosystems Mobile Outdoor Blended Immersive Learning Environment) is an extension of the EcoMUVE curriculum, developed at the Harvard Graduate School of Education. EcoMOBILE allows students to explore a virtual pond and extend their learning through one or more field trips to a local pond environment. Students can access and collect information and clues about the virtual environment via a mobile device. In addition, students can extend their learning to the real world.
http://ecomobile.gse.harvard.edu/

Econ 120: Two Minutes of Economic Sense
The NOAA Coastal Services Center's Econ 120 animated video series explains economic principles in everyday terms and shows how these principles relate to the important decisions faced by those who manage the resources of the coasts and oceans. Topics include externalities, economic indicators, and more.

http://www.csc.noaa.gov/digitalcoast/socialcoast/econ120

Economic Analysis for Ecosystem-Based Management of Ocean and Coastal Resources: An Introduction
This document from the Massachusetts Ocean Partnership provides an introduction to the use of economic analysis for ecosystem-based management. Environmental and natural resource economics utilizes tools such as cost-benefit analysis, cost-effectiveness analysis, economic-impact analysis, and models using market and non-market data to quantify values and predict behavior.
http://www.waterviewconsulting.com/files/Economic-Analysis-for-EBM-of-Ocean-and-Coastal-Resources-An-Introduction.pdf

Economic Incentives for Marine Conservation
Using natural and social sciences, the Science-to-Action partnership offers a variety of publications with recommendations for successful implementation of marine conservation to maximize the benefits to people and nature. A guidebook (Economic incentives for marine conservation) and policy brief (Case Studies of Three Economic Incentive Approaches in Marine Conservation) offer guidance on how to select and implement incentive-based solutions and outlines how to design an incentive approach.
http://www.science2action.org/component/content/article/143#economicincentives

Economic Instruments
The United Nations Environment Programme's International Working Group on Economic Instruments for Environmental Policymaking helps identify ways to enhance policy coordination related to the design and use of economic instruments at the national and international level and assists UNEP in defining its work program on economic instruments. The website offers practical tools and manuals to policy makers to help them design economic instruments that fit prevailing local economic, political, social, institutional, and environmental conditions.
http://www.unep.ch/etb/areas/econInst.php

Economic and Market Value of Coasts and Estuaries: What's At Stake?
The book, *The Economic and Market Value of America's Coasts and Estuaries: What's at Stake,* examines the economic value of our coasts and estuaries with an eye to understanding the economic benefits of protecting and restoring America's coasts and estuaries. Coasts and estuaries generate both economic value and economic impact. Updates to chapters, new chapters, and links to the types of data found in this book are available online at www.estuaries.org and www.coastalvalues.org.
http://www.estuaries.org/assets/documents/FINAL%20ECON%20WITH%20COVER%20PDF%205-20-2008.pdf

Economic Valuation of Coral Reefs in the Caribbean
The World Resources Institute offers reports on economic valuation of coral reefs in the Eastern Caribbean, along with downloadable valuation tools. The valuations focus on the economic contribution of coral reefs through tourism and recreation, fisheries, and shoreline protection services.
http://www.wri.org/project/valuation-caribbean-reefs

Economic Values of the World's Wetlands
This report highlights the high economic value of functioning wetlands. Seventy billion

U.S dollars worth of goods and services from freshwater resources could be at risk annually if governments fail to manage their wetlands sustainably.
http://www.panda.org/downloads/freshwater/wetlandsbrochurefinal.pdf

Economics of Ecosystems & Biodiversity
The German Federal Ministry for the Environment and the European Commission, with support of several other partners, have initiated preparatory work for the global study, *The Economics of Ecosystems & Biodiversity*. Preliminary findings from the first phase are available in the form of an interim report, available for download from the European Commission website.
http://ec.europa.eu/environment/nature/biodiversity/economics/

Economics of Ecosystems and Biodiversity
The Economics of Ecosystems and Biodiversity study is an international initiative to draw attention to the global economic benefits of biodiversity, to highlight the growing costs of biodiversity loss and ecosystem degradation, and to draw together expertise from the fields of science, economics, and policy to enable practical actions moving forward.
http://www.teebweb.org/

The Economics of Ecosystems and Biodiversity Reports
The Economics of Ecosystems and Biodiversity (TEEB) is compiling economics case studies for the conservation of ecosystems and biodiversity, evaluating the costs of the loss of biodiversity and the associated decline in ecosystem services worldwide, and comparing them with the costs of effective conservation and sustainable use.
http://www.teebweb.org/InformationMaterial/TEEBReports/tabid/1278/Default.aspx

Economics: National Ocean Watch
NOAA's ENOW website (Economics: National Ocean Watch) delivers data from the Census Bureau that is most important to coastal resource managers and the data wizard makes finding and using this data even simpler. Users can download or copy data for individual coastal counties, states, regions, or the coastal U.S. The data are available in a wide variety of formats, from ready-made summaries to full datasets.
http://www.csc.noaa.gov/ENOWDataWizard/

Ecopath with Ecosim
Ecopath with Ecosim is a free ecological/ecosystem modeling software suite. There are three main components: Ecopath - a static, mass-balanced snapshot of the system; Ecosim - a time dynamic simulation module for policy exploration; and Ecospace - a spatial and temporal dynamic module primarily designed for exploring impact and placement of protected areas. The website includes a user manual, tutorials, discussion forums, and more.
http://www.ecopath.org/

EcoRigs
EcoRigs supports the redeployment of retired oil and gas platforms for use in sustainable fisheries and eco-technology applications such as the production of energy from wind, waves and currents and more. The website hosts videos of marine life on the platforms, pictures, and information.
http://www.ecorigs.org/

Ecosystem Approach to Fisheries
Kevern Cochrane, former Director of the Fisheries and Aquaculture Resource Use and Conservation Division for the U.N. Food and Agriculture Organization, offers a list of ten Must-Be-Read Publications on the Ecosystem Approach to Fisheries, encompassing ecological, human, and governance dimensions.
http://openchannels.org/literature-library/top-eaf-ebfm

Ecosystem-Based Management Tools Network
The Ecosystem-Based Management (EBM) Tools Network is an alliance of EBM tool developers, practitioners, and training providers. The goals of the network include developing a knowledge base of coastal-marine EBM tools, increasing information about, access to, and honest evaluation of EBM tools, and others. Website visitors can search for tools, sign up for updates to the website, check out funding or training opportunities, and more.
http://www.ebmtools.org/

Ecosystem Management: Tradeoffs Among Human Activities
Marine Ecosystems and Management is published bimonthly by Marine Affairs Research and Education (MARE). Volume 5, No. 5 discusses making decisions about trade-offs and offers links to additional resources, including the EBM Roadmap: Tradeoffs among Human Activities.
http://www.ebmtools.org/roadmap/coreelements/6
http://depts.washington.edu/meam/

Ecosystem Services Provided by Waterbirds
This paper reviews the many ecosystem services provided by waterbirds. For those working on or teaching about waterbird and wetland conservation, it is technical in style but introduces a wide range of ideas for topics of discussion and offers pages of reference.
http://onlinelibrary.wiley.com/doi/10.1111/brv.12045/abstract

Ecosystem Services Report Series
Duke University's Nicholas Institute has launched a new series of reports examining critical issues in ecosystem services. The first two reports in the series focus on valuation, the first under the Wetland Reserve Program, the second focusing on ecosystem service markets as a possible means to achieve biodiversity conservation goals on private lands.
http://www.nicholas.duke.edu/institute/products.html#

Ecosystem Valuation
This website from NOAA and U.S. Department of Agriculture describes how economists value the beneficial ways that ecosystems affect people. It is designed for non-economists who need answers to questions about the benefits of ecosystem conservation, preservation, or restoration. It provides non-technical explanations of ecosystem valuation concepts, methods, and applications.
http://www.ecosystemvaluation.org/

Ecosystems, Livelihoods and Disasters: An integrated approach to disaster risk management
This publication from the IUCN provides recommendations for making disaster risk reduction strategies more effective. In the direct aftermath of a disaster, saving lives and

providing for safety and basic needs is clearly the domain of emergency professionals and humanitarian agencies. Existing environmental guidelines, laws, and policies are rarely applied in times of crisis. This downloadable document, under the Publications & Resources link, seeks to help address these problems.
http://www.iucn.org/themes/disaster/

EcoTipping Points Project
The EcoTipping Points website features environmental success stories collected from around the world by a team of scientists and journalists. The stories display a diversity of detail but have in common a community-based process switching environmental decline to a course of restoration and sustainability. Teachers interested in working with project staff to help incorporated the materials into their lessons should contact Gerry Marten through the website.
http://www.ecotippingpoints.org/

Ecoventures: Focus on the Gulf
EcoVentures: Focus on the Gulf is a multimedia CD designed to help middle school students learn about the Gulf of Mexico's aquatic environment and the issues associated with protecting and managing aquatic resources. Students enter the world of a fictional National Park to explore a variety of ecosystems and develop a management plan for the park. There are on-line activities, expert consultants, and a video encyclopedia.
http://eea.freac.fsu.edu .

EcoViz
EcoViz: Ecosystem Science and Visualizaion is a group of projects developing ecosystem science visualization products for research, education, and management applications. The goal is to research and develop landscape-scale visualizations as a means to enhance linkages between complex scientific research data sets, decision makers, and the general public. Recent work offers visualizations of MPAs and the research that is being done in support of them.
http://ecoviz.csumb.edu/home/

EcoWeek Florida Keys 2010
EcoWeek 2010 aims to educate and celebrate environmental preservation, promote sustainable ecotourism, enhance the local economy in an environmentally responsible way, and attract ecologically and socially conscious individuals to the Keys. It will start in the Upper Keys on October 31 with a Hallow-Green party, and continue with Middle Keys festivities November 4-11 and the Lower Keys/Key West partying from November 7-14, 2010. Check out the website and consider joining in.
http://ecoweekfloridakeys.com/

EcoZone Green Schools Initiative
NOAA's National Ocean Service recently joined the EcoZone Green Schools Initiative, a public-private environmental outreach and education effort sponsored by EcoMedia and the CBS Corporation. The program's goal is to inspire students to do what they can to help the environment. The Green Schools Initiative will begin as pilot projects in Miami, San Francisco, and Chicago, with the purpose of performing "green" makeovers on area schools.
http://www.ecozonemedia.com/greenmyschool/

Eddies
Eddies: Reflections on Fisheries Conservation is a new quarterly magazine focused on the Fish and Wildlife Service fisheries program. The full-color magazine highlights the aquatic conservation work of the service's fisheries program and its partners. You can read it online or subscribe to email alerts.
http://www.fws.gov/eddies/

EDGE of Existence
The EDGE of Existence program focuses on threatened species that represent a significant amount of unique evolutionary history. Using a scientific framework to identify the world's most Evolutionarily Distinct and Globally Endangered (EDGE) species, the program aims to put these species on the map and catalyze conservation action to secure their future. The website offers a brief overview, distribution, background information, and more for each species.
http://www.edgeofexistence.org/about/default.php

EDGES: Using GIS to Experience Sanctuaries
Channel Islands, Florida Keys, Gray's Reef, and Stellwagen Bank National Marine Sanctuaries have teamed up to utilize real scientific data in educational materials for teachers and students to explore America's special ocean areas. **E**xploring **D**ata using **G**eographic Information Systems to **E**xperience **S**anctuaries (EDGES) lessons include underwater treasures, submerged lands, and monitoring from afar.
Contact Sanctuary.Education@noaa.gov .

Edheads Weather
Edheads helps students learn through educational games and activities designed to meet state and national standards. Through one of the on-line activities, students learn how to report and predict the weather. A teacher guide, lesson plans, and weather glossary are included.
http://edheads.org/activities/weather/index.htm

Edmodo
Edmodo functions as a social network tool for the classroom, designed with learning in mind. The site allows teachers to post lesson plans, information, assignments, and other content.
https://www.edmodo.com/

Edmonds Discovery Programs
This website contains information about marine life and local Puget Sound ecosystems, and provides downloadable curriculum. The site features a marine life guide and a Beach Etiquette Pledge.
http://www.ci.edmonds.wa.us/Discovery_Programs%20Website/index.html

Edublogger
The Edublogger is designed to help educational bloggers with emerging technologies in education and can also be helpful for others who want to learn about blogging. Recent posts have included tips for getting students engaged in their classes through blogging, creating stronger passwords, and more. There are educator's guides to different social media, free web tools, and much more.
http://www.theedublogger.com

EducaPoles
The EducaPoles website from the International Polar Foundation sets out to sensitize young people and the educational world to the importance of the Polar Regions and of climate change. The website offers news and background information along with teacher guides, student activities, animations, and much more. You can also sign up for a newsletter on science and climate change.
http://www.educapoles.org/

Educating Stakeholders about MPAs
MPA News, Vol. 8, No. 7 from February 2007 (MPA82.pdf) published *Educating Stakeholders about MPAs: Practitioners Use an Array of Methods*, offering a discussion of various methods to increase public awareness and community understanding of the benefits that can come from resource protection. The article examines how practitioners have employed a variety of approaches to inform and educate stakeholders.
http://depts.washington.edu/mpanews/issues.html

Educating Young People About Water
The Environmental Resources Center at the University of Wisconsin-Madison offers Educating Young People About Water, guides, and a water curricula database providing assistance for developing a community-based, youth water education program. The resource can help you find and select water education curricula; develop a program appropriate to your situation; train others to design community-based, youth water programs; and more. Search the website from over 150 water-related curricula.
http://www.uwex.edu/erc/eypaw/

Education And Research: Testing Hypotheses
The Education And Research: Testing Hypotheses (EARTH) teacher workshops provide teachers with means for integrating real-time data with existing educational standards and tested curriculum in an interactive way. EARTH uses near-real-time data from ocean observatories to design and test outreach with the Internet as an interface to scientists, teachers, students, and the public. Teachers can compare ocean observing data collected in different regions of the United States to study how regions can vary and change on a variety of scales. The website offers unit plans, each with an associated group of activities; links to the activities via National Standards, Science Skills, or Ocean Literacy; an overview of each workshop, along with the activities generated by the
http://www.mbari.org/EARTH/

Education at AMNH
The American Museum of natural history has many free online resources useful to those studying marine and coastal environmental issues. Use the search feature to pull up resources using keywords such as ocean, coral, mangrove, and more.
http://education.amnh.org/

Education Center at ICRS
The 11th International Coral Reef Symposium (ICRS) in Fort Lauderdale will have an education center open to the public free of charge. Teachers, naturalists, scientists, and others can enjoy the four days filled with educational programs and demonstrations in the Coral Theater, informative booths hosted by facilities from across the globe, hands-on activities, and more.
http://www.nova.edu/ncri/11icrs/education.html

Education Discovery Classroom
Three new lesson plans have been added to NOAA's Education Discovery Classroom series: Ecological Forecasting/The Dead Zone; Marine Navigation/Do You Need a Map?; and Aerial Photography and Shoreline Mapping/Images of Katrina,. The National Ocean Service (NOS) Education Discovery Center is a collection of lesson plans developed in collaboration with NOS program offices. The 38 existing lesson plans cover 19 topical areas and emphasize hands-on activities using on-line data resources.
http://oceanservice.noaa.gov/education/classroom/welcome.html

Education on Energy and the Environment
The Newton Marasco Foundation offers the downloadable kit, Education on Energy and the Environment with quiz-show format games that focus on the environment and stewardship. The materials include instructions, tips, and evaluation forms for ecoSense and ecoLogic games; PowerPoint game with notes (includes the questions and answers with additional information, discussion questions, and references); a scorecard; and a spreadsheet with a list and links to additional environmental education resources.
http://www.newtonmarascofoundation.org/teach/classroom-games-toolkit/

Education and the Environment Initiative Curriculum Units
The final Education and the Environment Initiative curriculum units are now available online. The K-12 curriculum is comprised of 85 units teaching select science and history-social science academic standards.
http://www.calepa.ca.gov/Education/EEI/

Education in the National Estuarine Research Reserve System
The education section on National Estuarine Research Reserve System website has been updated. The changes include the addition of a new section for K-12 educators, links to an Estuaries Tutorial and curriculum, downloadable presentations for teachers, and much more. Be sure to check out the list of professional development programs offered around the country.
http://nerrs.noaa.gov/Education/welcome.html

Education Evaluation
The National Marine Sanctuary Program has launched a new website focused on the evaluation of environmental and marine education programs. The website includes information on how to create program evaluation plans, plan samples, tools and techniques for evaluation, an evaluation glossary, and more.
http://sanctuaries.noaa.gov/education/evaluation

Education Resources from Encyclopedia of Life
The educational resources from the Encyclopedia of Life have been organized by subject and themes. The information includes relevant articles, species collections, podcasts, and lesson plans/activities that can be used either to supplement existing curriculum or on their own.
http://eol.org/info/ed_resources

Education Resources for Oceans and Marine Resources
The National Climate Assessment education resources for oceans and marine resources highlight six key messages, including rising ocean temperatures, acidification, habitat loss, and more. The resources include links to lesson plans, videos, and more.
http://www.climate.gov/teaching/ocean-region

Education for a Sustainable and Secure Future Recommendations Online
The final report of the Council for Science and the Environment for recommendations for educational reform for the U.S. can be read online. The recommendations address topics such as sustainability and security curricula for K-12 and undergraduates, community education, and planetary health.
http://www.NCSEonline.org/NCSEconference/2003conference/

Education through Cultural and Historical Organizations (ECHO)
The Education through Cultural and Historical Organizations (ECHO) Act is a federally funded educational and cultural enrichment initiative, serving children, teachers, and adult continuing learners in Alaska, Hawai'i, and Massachusetts. ECHO brings to culturally diverse audiences programs collaboratively produced by five regional cultural institutions: Alaska Native Heritage Center and Iñupiat Heritage Center in Alaska; Bishop Museum in Hawai'i; New Bedford Whaling Museum and New Bedford Oceanarium; and Peabody Essex Museum in Massachusetts.
Contact Bob Rocha at rrocha@whalingmuseum.org or (508) 997-0046 x149
www.echonsb.org and www.echospace.org

Educational Passages
Educational Passages uses miniature sailboats as an educational tool for oceanography, earth science, geography, international relationships, and more. They are expanding into the Pacific Ocean and are looking for schools and other marine educational associations to join in upcoming events. Sign up for the mailing list, check out the boat tracking, and contact them for more information.
http://educationalpassages.com/

Education Resources for the Alaska Region
The National Climate Assessment education resources for the Alaska region highlight five key messages, including disappearing sea ice, native communities, and more. The resources include links to lesson plans, videos, and more.
http://www.climate.gov/teaching/alaska-region

Educational Resources from Busch Gardens and Sea World
SeaWorld, Busch Gardens, and Discovery Cove offer career resources; a Fun Zone with coloring books, song books and more; teacher resources with downloadable classroom activities, teacher guides; and much more. Take time to explore this website.
http://www.swbg-animals.org/index.asp

Education Resources for the Northwest Region
The National Climate Assessment education resources for the Northwest region highlight four key messages: Water-related Challenges, Coastal Vulnerabilities, Impacts on Forests, and Adapting Agriculture.
http://www.climate.gov/teaching/northwest-region

Educational Uses of Digital Storytelling
Digital storytelling utilizes computer-based tools to tell stories. This website offers a primer on digital storytelling, examples, and news. The Educational Materials area contains a lesson plan, information about copyright infringement, a Digital Storytelling Teaching Guide, and more.
http://digitalstorytelling.coe.uh.edu/

Education.com
This website offers a variety of resources for school children, including worksheets, activities, games, and much more.
http://www.education.com/

Educationlist
This website is an environmental and conservation education catalog. Users can create profiles about programs, events, job postings, grant listings, and more. The website is meant to act as a catalog for EE and CE resources. It can be used to market services and programs to key audiences, and offers a networking and coordination platform.
http://www.educationalist.net/content/catalog-ee-and-ce-resources

Educationalist.net
Educationalist.net is billed as a catalog of environmental and conservation education organizations, programs, and events. It offers links to environmental education, conservation education, nature interpretation, and other programs that offer resources to the K-12 audience relating to the environment or natural systems. Check it out and add your resources to the list.
http://educationalist.net/

EducationAtlas.Com
This website provides links to many educational resources for K-12 teachers, students, higher education, homeschoolers, bilingual education, and more.
http://www.educationatlas.com/

Educator Resources from the California Department of Fish & Game
The California Department of Fish and Game, Office of Natural Resource Education, has a variety of web-based resources for educators. These include a Project WILD Aquatic online workshop, the first offering from a marine curriculum, and a newsletter with educational materials, kid's activity, and regional and local events.
http://www.dfg.ca.gov/coned/index.html .

Educators' Bridge
The National Center for Atmospheric Research offers the Educators' Bridge website with links to lessons and guides for teaching about earth's climate, atmospheric science, and other earth science topics. The website refers to (and includes links to) The Kids Crossing Guide for Educators with activities for hands-on science exploration.
http://eo.ucar.edu/educators/

Educators Guide to Marine Debris
The Educators Guide to Marine Debris: Southeast and Gulf of Mexico is a 44-page online booklet of marine debris information and lessons. The guide highlights regional issues concerning abandoned vessels, fishing gear, and litter, and contains lessons and resources.
http://www.cosee-se.org/marinedebris.php

Educator's Guide to Nonpoint Source Water Pollution
The Kentucky Waterways Alliance provides a downloadable manual with hands-on lesson plans and activities relating to Kentucky's water and nonpoint source pollution.

Students will gain an appreciation of the environmental sensitivity of water quality, explore the relationships of hydrologic components within a watershed, understand how human activities can affect the watershed, and learn responsible water resource management. Most of the activities are interdisciplinary.
www.kywater.net/KWA/splas01.doc

EDUCAUSE Live!
EDUCAUSE Live! is a series of free, hour-long interactive web seminars on information technology topics in higher education. In the Archives area, visitors can view previous programs; many include slides and other supplementary materials.
http://www.educause.edu/live

edudemic
This website offers a platform dedicated to what's next in learning by connecting technology, emerging trends, social media, and culture. The website focuses on social media applications, flexible learning frameworks, and more. While the website is packed, the article headlines offer a good summary of what you'll find – often a numbered list such as 10 STEM Apps To Teach About The Environment.
http://edudemic.com/

Edutopia Summer Blog
Learn more about project-based learning, classroom management techniques, how to use new media tools in the classroom, and more through this summer blog from Edutopia. Each week, new tools and tips will be added to help you improve your teaching practice.
http://www.edutopia.org/blog/professional-development-series

Edutopia Top Staff Picks
In Edutopia: What Works in Public Education, Edutopia staff look back on 2009 and spotlight their favorite articles, videos, blogs, and discussions.
http://www.edutopia.org/content-edutopia-staff-picks-2009#

EE-Link Website Update
The North American Association of Environmental Education (NAAEE) and EE-Link websites have been updated, with dynamic content, better information organization, and integrated search capabilities to make it easier for you to find what you need. Visit EE-Link with thousands of links to environmental education resources for a preview, and NAAEE for information on new initiatives, association news, conference information, and more.
http://naaee.org

EE Guidelines for Excellence
Environmental Education Materials: Guidelines for Excellence provides a set of recommendations for developing and selecting environmental education materials. These guidelines aim to help developers of activity guides, lesson plans, and other instructional materials produce high quality products, and to provide educators with a tool to evaluate the wide array of available environmental education materials. They have been revised and reprinted, and are available for downloading from the website.
http://naaee.org/publications

EE in Mexico
The Senderos e-bulletin from the Border-Wide EE Coalition features stories and news from the border region's environmental educators, and information about programs and events taking place in all of the ten US-Mexico Border States. Check out the on-line version in English or Spanish.
http://www.eecc.net/ecostarteng.htm

EE Organization Mapping Tool
Finding EE organizations just got easier. Now, in addition to being able to see your search results in a list, you can also see them as points on a map. After searching for organizations or schools that fit specific criteria, click the orange "Map Results" button to the top right of your list for a Google map.
http://eeintennessee.org/net/content/search.aspx?s=0.0.0&btid=3&load=0&tid=38021&basic=1

EE Week Ocean Connections
The theme for National Environmental Education Week, April 10-16, 2011, is *Ocean Connections*. The website offers resources, lesson plans, and opportunities for educator professional development. Check out the quiz page for nature, ocean, and water quizzes. Share your story of success about how you engage your students in environmental education tied to the ocean. Green Teacher magazine will provide registered participants a free digital copy of their spring marine education issue.
http://www.eeweek.org/success
http://eeweek.org/ocean_connections.htm
http://www.greenteacher.com/

EE Week 2011 Resources
Recognizing the importance of protecting the health of our ocean and understanding our dependence upon it regardless of its proximity, EE Week's 2011 theme is *Ocean Connections*. EE Week will provide special resources, lesson plans, and opportunities for educator professional development and student learning about the Gulf oil spill. Register to receive monthly e-mail newsletters with classroom activities, funding resources, and professional development opportunities.
http://eeweek.org/ocean_connections

EE Week
The EE Week 2012 Promotional Toolkit offers participants an easy way to share information about EE Week, April 15-21, and the 2012 theme, *Greening STEM: The Environment as Inspiration for 21st Century Learning*. Sign up for the webinar, Technology Goes Wild: New Tools for Connecting Classrooms with Nature, March 14, 2012. April 13-19, 2014 year's theme is Engineering a Sustainable World. April 19-25, 2015, Surrounded by Science.
http://eeweek.org/

EETAP Resource Library
The EETAP Resource Library, now moved to EE-Link, makes environmental education resources more accessible. A major component of the Library is Info-Sheets, 1-2 page descriptions that summarize a specific EE topic and identify resources for additional reading.
http://eelink.net/eetapresourcelibrary.html .

Effective Practices Collection
The Corporation for National and Community Service offers the Effective Practices Collection, with over 650 good ideas, replicable strategies, and evidence-based studies to help service programs solve problems they may face. You can search the database by topic area, and submit your own effective program.
http://nationalserviceresources.org/epicenter/submit/index.php

eField Trips for Fall
Take your class on a field trip to Biscayne National Park to participate in an underwater adventure, to the freshwater wetlands of Watsonville, to the volcanoes of Hawai'i, or for a visit with Florida manatees. All trips have four major components: a virtual visit, an interactive multi-media web experience that your students can complete at their own pace anytime; a Trip Journal, a short worksheet that students complete as they complete the Virtual Visit, Ask the Experts, and specific times for a Live Web Chat.
www.eFieldTrips.org .

eField Trips – Glacier Bay
Check out the eField trips available, both upcoming and archived. In general, each program has four major components: a virtual visit, a trip journal worksheet, Ask the Experts, and a live webchat. Archives of the questions are posted on the website. Don't miss *Glacier Bay: A Living Laboratory for Studying Marine Mammals*, hosted by Glacier Bay National Park and Preserve.
http://www.efieldtrips.org/Schedules/searchResults.cfm?searchType=all

E-Field Trips on Invasive Species, Alaskan Coast Invertebrates, and Shorebirds
During April 2004, the National Wildlife Refuge System is offering the eFieldTrip titled, *Invasive Species: America's Least Wanted!,* geared toward 4-6th grade students. Students will have the opportunity to learn about invasive species and why they are a menace. The eFieldTrip has four interactive components allowing students to complete the program at their own pace. There is no cost for schools or students to participate.
http://www.efieldtrips.org/Schedules/schedule_0404.cfm .

eField Trips – Manatees and Sea Turtles
Check out the eField trips available, both upcoming and archived. In general, each program has four major components: a virtual visit, a trip journal worksheet, Ask the Experts, and a live webchat. Archives of the questions are posted on the website. Don't miss the highlighted field trips on Manatees and Sea Turtles.
http://www.efieldtrips.org/

Electronic Navigational Charts Direct to GIS Web Portal
The NOAA ENC Direct to GIS web portal provides comprehensive access to display, query, and download all available large-scale NOAA ENC (electronic navigational charts) data in a variety of GIS/CAD formats for non-navigational purposes using Internet mapping service technology. Nautical charts include coastal topography, bathymetry, landmarks, geographic place names, and marine boundaries.
http://nauticalcharts.noaa.gov/csdl/ctp/encdirect_new.htm

Electronic Naturalist
The Electronic Naturalist is an on-line education program providing a weekly environmental education unit. Each unit has artwork, text, activities, additional web sites, plus online access to a professional naturalist. Two reading levels are available for

grades K-3 (Quick Read) and 4-8 (Full Read). The units cover insects, fish, amphibians, reptiles, birds, mammals, plants, and environmental issues.
http://www.enaturalist.org/index.htm .

Elephant Seals Homecoming Days
Learn about the female elephant seals' 21,000-mile annual journeys during Elephant Seal Homecoming Days, sponsored by TOPP (Tagging of Pacific Predators), California State Parks, and California State Parks Foundation. The TOPP website features background information about research on the elephant seals at Año Nuevo State Reserve, lesson plans for teachers, links to pertinent parts of the Año Nuevo State Reserve site, and videos.
http://www.topp.org/elephant_seal_homecoming_days

eLife
eLife publishes research in the life sciences and biomedicine, from fundamental and theoretical work, through to translational, applied, and clinical research. The open access journal aims to review and publish work quickly. Topics include ecology, biology, and more. Visitors can read articles online, download them, view them in journal form, and view metrics about readership. Check out Point of view: Telling it like it is.
http://elifesciences.org/

Elliott Wildlife Values Project
The Elliott Wildlife Values Project and its Linking Girls to the Land program at Girl Scouts of the USA develop girls as leaders of environmental stewardship and conservation efforts who positively impact their communities and the world. They offer the 2007 National Conservation Events Calendar listing over 40 events, web sites, and a conservation history. Girl Scouts can earn the Get with the Land Patch by volunteering in national conservation events in collaboration with natural resource agencies.
http://www.girlscouts.org/program/program_opportunities/environment/elliott_wildlife.asp
http://www.girlscouts.org/program/program_opportunities/environment/2007_conservation_events_calendar.pdf

Emergency Contact Card
Save the Children offers a free, downloadable emergency contact card to help children and their caregivers by offering a reliable emergency contact card that can be used during a calamity.
https://secure.savethechildren.org/site/c.8rKLIXMGIpI4E/b.9292307/k.E461/Get_Ready_Get_Safe_Emergency_Contact_Cards/apps/ka/ct/contactcustom.asp

Emergency Management for Schools
This website from the Australian Government offers resources, lesson plans, and more. Check out the webquest and adopt it to your school.
http://www.em.gov.au/sites/schools/Pages/default.aspx

Emergency 2.0 Wiki
The Emergency 2.0 Wiki is a free global resource for using social media and new technology in emergencies. The Wiki serves a global hub for emergency agencies, government, the public, and others to use social media to better prepare for, respond to, and recover from emergencies. The information on the website includes guides, apps, mapping tools, practical guidelines, and much more. It hopes to advance emergency communications and build emergency resilient communities.

http://emergency20wiki.org/

eNature.com
eNature.com, from the Shearwater Marketing Group, offers information about the wild animals and plants of the United States. The site's core content of wildlife information about almost 6,000 individual species is the same data set used to create the printed Audubon Field Guides. The website offers the ability to keep personal wildlife lists, sign up for newsletters, download mating call ringtones, track migration, and search wildlife guides.
http://wild.enature.com/ringtones/

Enchanted Learning
Enchanted Learning® produces children's educational web sites which are designed to capture the imagination while maximizing creativity, learning, and enjoyment. Spend some time on this website and check out the dictionary, biology section, physical sciences, and much more.
http://www.enchantedlearning.com/Home.html

Encouraging Young Scientists
NSTA offers a new, free newsletter for preK-2 teachers, *Encouraging Young Scientists*. This monthly newsletter aims to make science accessible to and achievable by young children, and offers classroom resources and ideas.
http://www.nsta.org/publications/archive-eys.aspx

Encyclopedia Arctica
The Encyclopedia Arctica is the typescript of a proposed 20-volume reference work on the northern arctic and subarctic regions. The project was begun in 1947 under the sponsorship of the Office of Naval Research, Department of the Navy but support was withdrawn in 1951 after 3-4 million words had been written. Subjects covered include archaeology, anthropology, botany, engineering, geography, geology, history, law (including international relations); language, medicine, meteorology, oceanography, religion, zoology, biographies, and special topics. The glossary alone is 121 pages, with a 3-page introduction.
http://www.dartmouth.edu/~library/digital/collections/ocn238796413/index.html

Encyclopedia of Earth Collections
The Encyclopedia of Earth (EoE) brings together some of the world's leading scientists and organizations and presents the essential knowledge underlying a variety of issues. The EoE, one component of the Earth Portal, is a free, expert-driven, scaleable, online information resource about the environment published online by the National Council for Science and the Environment. Collections include climate change, coral reefs, ecology, environmental and social issues in economics, natural world heritage sites, and more.
http://www.eoearth.org/article/Collections

Encyclopedia of Earth: People
This website from the Encyclopedia of Earth focuses on the researchers who have made great science happen. Entries are broken down into categories that include Biologists, Environmental Scientists, and more.
http://www.eoearth.org/topics/view/51cbfc78f702fc2ba8129e86/

Encyclopedia of Flora and Fauna of the Northwestern Hawaiian Islands
The Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve has an online encyclopedia to showcase the flora and fauna that inhabit the region. The encyclopedia features over 130 plants and animals, complete with imagery and some video. For each organism, a short description is given along with information on status, distribution, habitat, quick facts, and more.
http://noaa.stage.webthink.com/onms/Park/Parks/?pID=12

Encyclopedia of Life
The Encyclopedia of Life is a global effort to document all 1.8 million named species of animals, plants, and other forms of life on Earth. The encyclopedia will be a multimedia Wikipedia-style website offering downloadable information on each species. Scanning and digitization of the biodiversity literature is now underway in London, Boston, and Washington DC. The first 30,000 pages of a massive online Encyclopedia of Life (EOL) are available. The EOL is being developed by a unique collaboration between scientists and the general public. By making it easy to compare and contrast information about life on Earth, the resulting compendium has the potential to provide new insights into many of life's secrets.
http://www.eol.org/

Encyclopedia of Life Collections
Explore the current collections on the Encyclopedia of Life website. Users have organized lists of species, information, media, and more into a virtual collection that can be annotated and shared. Check out best images, illustrations, morphology, and more.
http://eol.org/info/discover_collections

Encyclopedia of the National Marine Sanctuaries
The Encyclopedia of the National Marine Sanctuaries is an online guide that provides visitors access to photos, videos, and biological information for over 100 species of interest from each of the marine protected areas managed by NOAA. New sections highlighting the Stellwagen Bank and Thunder Bay national marine sanctuaries are now available.
http://www8.nos.noaa.gov/onms/park/

Encyclopedia of the Sanctuaries - On-Line Marine Life Field Guide
NOAA's National Marine Sanctuary Program offers an online resource that highlights the diverse marine life of America's ocean and Great Lakes treasures. The Encyclopedia of the Sanctuaries is available online, providing photos, streaming video and biological information for over 100 marine species from each of the national marine sanctuaries in the United States. The Encyclopedia of the Sanctuaries allows visitors to search for their favorite species, as well as view streaming video of marine life
http://sanctuaries.noaa.gov/education
http://marinelife.noaa.gov/

Encyclopedia Smithsonian: Science and Technology
The Encyclopedia Smithsonian covers science and technology through materials drawn from different parts of the Smithsonian Institution. Topics include Biodiversity, Ecology, Fishes, and much, much more. Current highlights include Looking at Earth, Arctic: A Friend Acting Strangely, Bird of the Month, and more. Other links bring you to Encyclopedia: History and Culture and Encyclopedia: Art and Design. It's easy to spend hours clicking through interesting and informative web pages through this site.

http://www.si.edu/Encyclopedia_SI/Science_and_Technology/default.htm

End of the Line
The End of the Line is a documentary film highlighting the impact of overfishing on the oceans. It examines the imminent extinction of bluefin tuna, brought on by increasing western demand for sushi; the impact on marine life resulting in huge overpopulation of jellyfish; and implications of a future world with no fish. The website hosts the cinema trailer and links to short episodes that you can view online, expected screening dates, and more.
http://endoftheline.com/

End of Year Ideas from the Bridge
As the school year draws to a close, now is a perfect time to incorporate the oceans into those end-of-year projects. Find science fair-style project ideas in the Bridge's Guiding Students section, or take your students on a virtual ocean expedition to a hydrothermal vent system. Information on local aquaria and research institutions is also available to schedule that last minute field trip. Have your students research a marine habitat and relate it to the biology, chemistry, physics, or geology concepts they learned this year.
http://www.marine-ed.org/bridge

End of Year Ideas from the Bridge
As we end another school year, now is a perfect time to incorporate the oceans into those last minute class projects. Find science fair-style project ideas in the Bridge's Guiding Students section, walk your students through one of our Data Analysis Teaching Activities, or take them on a virtual ocean expedition to the Antarctic. Information on local aquaria and research institutions is also available to schedule that end-of-year field trip.
http://www.marine-ed.org/bridge

Endangered Caribbean Sea Turtles: An Educator's Handbook
This comprehensive handbook offers nearly 40 classroom activities that use sea turtles to teach concepts related to natural science, geography, social studies, team building, statistical analysis, public speaking, and more. By exploring sea turtle diving and feeding, navigation and migration, nesting and hatching, as well as the various factors that threaten sea turtle survival, including pollution, international trade, fisheries, and habitat loss, students gain a greater understanding of contemporary marine science and conservation issues. The Spanish edition will be available in 2008
Contact Karen Eckert at keckert@widecast.org

Endangered Species Act 40th Anniversary
The U.S. Fish and Wildlife Service, co-administrator of the Endangered Species Act (ESA) with NOAA Fisheries, has already kicked off their ESA 40th celebration. The website offers This Day in History, Media Kit/Resources, Know Your Species, and more. Be sure to also check out the NOAA Fisheries and Endangered Species Day websites for resources, events, and more.
http://www.fws.gov/endangered/ESA40/index.html
http://www.nmfs.noaa.gov/pr/species/
http://www.stopextinction.org/esd.html

Endangered Species Bulletin
The U.S. Fish and Wildlife Service offers the quarterly Endangered Species Bulletin, with information on rulemakings, recovery plans and activities, conservation partnerships, research developments, and a variety of other issues. The Summer 2009 issue was focused entirely oceans and includes articles on corals, sea turtles, the Hawaiian Monk Seal, and more.
http://www.fws.gov/Endangered/bulletin.html

Endangered Species Day
Endangered Species Day, May 21, 2010, celebrates America's wildlife legacy with a celebration of our nation's wildlife and wild places, and is an opportunity to learn about the everyday actions that people can take to help protect our nation's disappearing wildlife and last remaining wild places. Visit the website to download educational materials, register an event, and check out the toolkit. May 15, 21015
http://www.stopextinction.org/esd.html

Endangered Species Day
May 15, 2009 is Endangered Species Day. Events will be held across the country to raise awareness about the threats to endangered species, including global warming, and success stories in species recovery. Register your event, download educational materials, and more from the website.
http://www.stopextinction.org/cgi-bin/giga.cgi?cmd=cause_dir_custom&cause_id=1704&page=day

Endangered Species Day
May 11, 2006, May 18, 2007, is Endangered Species Day. Take this opportunity to educate your students about the importance of protecting endangered species and highlight the everyday actions that individuals and groups can take to help protect our nation's wildlife, fish and plants. The website includes links to websites with background information and lesson plans.
http://www.stopextinction.org/
http://www.stopextinction.org/endangeredspeciesday

Endangered Species Day
National Endangered Species Day, May 16, 2008 provides an opportunity for parks, wildlife refuges, zoos, aquariums, conservation organizations, and others to educate the public about the importance of protecting endangered species. This special day is also an opportunity to highlight the everyday actions that individuals and groups can take to help protect our nation's wildlife, fish, and plants. Check out events in your area, download educational materials, and more.
https://www.givengain.com/cgi-bin/giga.cgi?cmd=cause_dir_custom&cause_id=1704&page=day

Endangered Species Interactive Map
The U. S. Fish and Wildlife Service Endangered Species Program has launched a web-based interactive map with information about endangered species success in every state: stories of species making strides towards recovery, audio interviews and podcasts with biologists about on-the-ground endangered species conservation, and more. Check out the audio interviews; they offer more depth than a simple sound bite.
http://www.fws.gov/endangered/map/index.html

Endangered Species Research
This facebook page is set up to promote access to Endangered Species Research articles.
https://www.facebook.com/EndangeredSpeciesResearch

Endangered Species Research
Inter-Research produces web-hosted publications, with on-line abstracts and many on-line full text articles. The latest journal is *Endangered Species Research*. Others include *Marine Ecology Progress Series, Climate Research, Ethics in Science and Environmental Politics,* and more.
http://www.int-res.com/home/

Endangered Species Teacher Forum
As part of an ongoing focus on enhancing endangered species education, the Endangered Species Day Teacher Resource Center now features a Teacher Forum. The forum enables teachers to exchange classroom instruction techniques, ask questions, and share resources about endangered species.
http://www.stopextinction.org/esd/195-esd-education.html

Endangered and Threatened Species Curriculum
The Center for Alaskan Coastal Studies has an Endangered Species of Alaska Activity Guide that can be downloaded from their website. These materials focus on selected Alaskan species that are threatened, endangered, or at risk. Learn about wildlife population dynamics, the factors that may place species at risk, and efforts by people to help wildlife species recover. The teaching packet is designed to introduce the concepts of biodiversity and endangered species to your students in a hands-on interactive way.
http://www.akcoastalstudies.org/education-resources/65-endangered-and-threatened-species-curriculum-.html

Enduring Resources for Earth Sciences Education
Enduring Resources for Earth Sciences Education is a database of materials for teaching earth science concepts. Created by teachers and earth scientists, the database includes maps, documents, and other resources for teaching about earthquakes, oceans, plate tectonics, hyrdrothermal systems, geological time, and more.
http://earthref.org/ERESE/

Energy Choices and Climate Change
From the NCAR Online Education, *Energy Choices and Climate Change* looks at issues related to energy and climate change. Participants make decisions about the types and amount of energy used and see what effect the decisions have on the amount of greenhouse gases emitted to the atmosphere, either from a family's energy use or global energy use. The website also offers links to greenhouse gas background information. Be sure to also explore the Windows to the Universe website from the link at the bottom.
http://www.windows2universe.org/modules/energy/

Energy for Keeps – Electricity From Renewable Energy
Energy for Keeps is a comprehensive renewable energy publication for middle and high school education that covers the history, availability, impacts, technologies, and management of the resources that are used to generate electricity. Activities have been correlated to National Science Standards. It is available as a free download from the producers, Educators for the Environment.

http://www.energyforkeeps.org/ .

Energy Lesson Plans and Activities
The Department of Energy offers this K-12 Energy Lesson Plans and Activities website, with 350 lessons on energy efficiency and renewable energy. Organized by grade level and topic, the website allows students and teachers to study biomass, ocean energy, energy efficiency and conservation, and much more
http://www.eere.energy.gov/education/lessonplans/

Energy and Material Cycles Visualizations
Energy and Material Cycles Visualizations, from the Science Education Resource Center at Carleton College, provides animations, images, graphs, and photos on the carbon cycle, greenhouse gases, sea ice, continental drift, and more.
http://serc.carleton.edu/NAGTWorkshops/visualization/collections/Cycles.html

Energy-Related Laboratory Equipment Program
U.S. middle and high schools are now eligible to participate in the Department of Energy's Used Energy-Related Laboratory Equipment (ERLE) program. The ERLE Grant Program was established to grant available excess of used energy-related laboratory equipment to middle schools, high schools, universities, and colleges and other nonprofit educational institutions of higher learning in the United States for use in energy oriented educational programs.
http://www.osti.gov/erle/

Energy Works Michigan
Energy Works Michigan offers free, downloadable lesson plans on energy efficiency, solar energy, and wind energy. The hands-on, inquiry-based lessons, written for students in grades 3-12, challenge students to conduct classroom energy audits, interpret wind maps to assess potential wind turbine sites, and more.
http://energyworksmichigan.org/educational-resources

Enforcing U.S. Marine Protected Areas: Synthesis Report
The MPA Center has published *Enforcing U.S. Marine Protected Areas: Synthesis Report*. MPA.gov also hosts a link to the report and a presentation highlighting aspects of the report. The report provides a synthesis of existing information relevant to the enforcement of marine protected areas in the United States, as well as new insights into the current challenges, needs, and suggestions of coastal and marine resource managers, enforcement agencies, education/outreach specialists, and others.
http://www3.mpa.gov/mpa_lib/publications.aspx

Engaging the Public through Communication and Social Science
The Biodiversity Project brings us *Breakthrough Strategies for Engaging the Public: Emerging Trends in Communications and Social Science*. This working draft white paper provides an introduction to some emerging trends in the fields of communications and social science that could benefit public education, engagement, and awareness campaign planners. Drawing from a variety of resources, this paper attempts to address the challenges faced when communicating about biodiversity and our environment.
http://www.biodiversityproject.org/publications.htm

Engineering Disasters: New Orleans
Hurricane Katrina devastated New Orleans, submerging it under a torrent of floodwater. *Engineering Disasters: New Orleans* is a one-hour documentary investigating why the levees and water-pumping system failed in the wake of the hurricane. Follow Geological Detectives as uncover how 80% of the city was left underwater; expose how the levee system was a disaster in the making; and delve deep into the 100-year-old pump system to unearth why it failed and took weeks to drain the city.
http://www.historychannel.com/modernmarvels/?page=home

ENO-Environment Online
ENO-Environment Online is a free, international Internet-based school for teachers and students interested in environmental issues and global education, administrated by the city of Joensuu, Finland. Themes include: local community issues; climate change; ecological footprint; and traditional food. Approximately 250 new English-speaking schools will be selected to become members for the school year 2006 -2007.
http://eno.joensuu.fi/apply/

Ensia
From the Institute on the Environment at the University of Minnesota, Ensia is a magazine showcasing environmental solutions in action. The magazine offers short articles on a variety of current science and sustainability topics, including Ecosystems, Culture, Business, and more. Sections include articles, interview, multimedia, and more. Visitors can sign up for the weekly newsletter highlighting top stories.
http://ensia.com/

ENSO Blog
On NOAA's Climate.gov website, a group of climate scientists periodically share a new post and engage in discussions on the El Niño-Southern Oscillation (ENSO). Check back for scientific perspectives on the ongoing El Niño Watch.
http://www.climate.gov/news-features/department/8443/all

Entomology and Nematology: Featured Creatures
The Entomology and Nematology Department at the University of Florida hosts this encyclopedia of insects, nematodes, arachnids, and other organisms. While the site concentrates on Florida-based creatures, the diversity of organisms listed can be enough for many inquiries. Each organism is accompanied by an introduction, distribution, life cycle, and more.
http://entnemdept.ufl.edu/creatures/

Environment and Global Climate Change
The University of the Arctic offers an "Introduction to the Circumpolar World" module for students grades 9-12 addressing climate change and potential environmental changes in the Arctic.
http://www.uarctic.org/bcs/BCS100/bcs100_m6.pdf

Environment Yale
The Journal of the Yale School of Forestry and Environmental Studies has a new website for the Fall 2009 issue, with links to past Issues on the previous website. The journal is published twice per year. Past issues have a search feature.
http://environment.yale.edu/magazine/

Environmental Dilemmas in Georgia
This downloadable resource book is intended to serve as a tool for educators who are interested in incorporating problem-solving strategies and contextual teaching/learning into their curriculum. Each contribution provides the background on a specific environmental dilemma found in Georgia and poses a problem for inquiry. Solutions are offered, but the readers should provide more possibilities, and come to a group consensus as to the most viable solution using an evaluation matrix. Covered issues include water, fish, invasive species, urbanization, and much more.
http://www.eeingeorgia.org/net/content/page.aspx?s=49027.0.68.4863

Environmental Economics
NOAA's Office of Response and Restoration offers this website with background information about Environmental Economics, along with how the Damage Assessment, Remediation, and Restoration Program uses a variety of economic and non-economic science-based methodologies to assess natural resource injuries and assesses compensation for the public loss.
http://www.darrp.noaa.gov/economics/index.html

Environmental Education in Action
EPA's Office of Environmental Education hosted three webinars to introduce this new initiative at the EPA that showcases environmental education programs and resources. The website includes links to environmental education grants, teacher awards, educational resources, and more, including links to the archived webinars.
http://www.epa.gov/education/index2.html

Environmental Education Apps
Moms With Apps identifies seven apps for young learners that can help develop skills and knowledge in STEM subjects. (Note that most listed here are not free).
https://momswithapps.com/blog/environment

Environmental Education Articles from EETAP
Environmental Education and Training Partnership (EETAP) offers four new articles on key initiatives in environmental education:

- Leading the Way to Environmental Literacy and Quality: National Guidelines for Environmental Education
- EE Certification: Making Best Practice Standard Practice
- Distance Education: A User Friendly Learning Option
- The Roots of Environmental Education: How the Past Supports the Future

http://naaee.org/pages/publications/eetap_newpubs

Environmental Education Capacity Building Publications Survey
The National Environmental Education Advancement Project (NEEAP), funded through Environmental Education and Training Partnership (EETAP), has an online survey that seeks to document the value and use of various EE publications by those involved in EE capacity building efforts at the national, state and local levels. Your time and advice is greatly appreciated.
http://www.uwsp.edu/cnr/neeap/publications/pubsurvey.htm .

Environmental Education Clip Art and Photographs from the EPA
Photos can be worth a thousand words. The Environmental Protection Agency provides links to easily downloadable, environmentally-themed photos and clip art.
http://www.epa.gov/epaoswer/education/photos.htm

Environmental Education Curricula Library
Check out National Environmental Education Week's library of curricular resources. Topics include Amphibians and Reptiles, Birds, Climate Change, and much more. Other resources include green reading, newsletters, funding resources, and more.
http://www.eeweek.org/resources/curricula_library.htm

Environmental Education in Georgia Website
The EEinGEORGIA.org website provides: EE lesson plans based on Georgia's Quality Core Curriculum standards, a searchable directory of Georgia's EE providers and the resources they offer, a statewide calendar of EE events, EE news, and easy-to-access facts about Georgia's environment. It also hosts an interactive GIS map of EE providers in the state.
http://eeingeorgia.org/net/go/default.aspx?siteid=4863

Environmental Education for Kids
The Wisconsin Department of Natural Resources offers the EEK! website for kids and teachers, grades 4-8. A quick review shows that Nature Notes includes information about habitats and phenology; Our Earth covers water wonders, invasive and endangered species; Career Zones introduces park naturalists and hydrogeologists; and the Teacher Pages have activities and educational resources. The website is formatted for the younger student and includes plenty of useful information.
http://www.dnr.state.wi.us/org/caer/ce/eek/index.htm

Environmental Education Listserv - California
Join the California Department of Education's Environmental Science/Environmental Education Listserv to receive time-sensitive statewide announcements about grants, contests, and events.
Send a blank message to Join-environmental-science-ed@mlist.cde.ca.gov

Environmental Education in New Zealand Schools
A four-volume report highlighting research on environmental education practice provides lessons for school-based development of New Zealand curriculum for programs in special focus areas, and is meant to serve as a resource for schools who want to develop their own environmental education programs. The report, Environmental Education in New Zealand Schools: Research into Current Practice and Future Possibilities, is from the New Zealand Council for Educational Research and Waikato University.
www.minedu.govt.nz/goto/eereports .

Environmental Education Program, Lee County
Lee County, Florida, stretches from the shell-strewn beaches of Sanibel Island to the deep green of Six Mile Cypress Slough. The long history of the Environmental Education Program includes national recognition and awards from the National Science Teachers Association as one of the ten best Environmental Education programs in the US. Components of the program include the Aquatic Systems/ Mosquito Control program, Estuary Animals and Mudflats field trip, and Six Mile Cypress Slough wet field trip.

www.lee.k12.fl.us/dept/ee/ .

Environmental Education Research Bulletins
Environmental Education Research Bulletins aim to help bridge the gap between research and practice with an emphasis on field science, stewardship behavior, residential settings, and more. The bulletin can help educators keep up with current EE research.
http://eelinked.naaee.net/n/eeresearch/posts/Research-Bulletins-Help-Bridge-Research-to-Practice-Gap

Environmental Education Resources
The National Conservation Training Center's Division of Education Outreach of the U.S. Fish and Wildlife Service (FWS) offers this document online. It provides listings and links to general environmental education resources, education standards and terms, newswires and FWS listservs, lists of FWS environmental educators and resources, and much more.
http://library.fws.gov/resources.html

Environmental Education Works
The EE-works is a service of the National Environmental Education and Training Foundation (NEETF). The website hosts data, studies, and case examples of how environmental education has a measurable impact on environmental protection and improved student learning include better results on standard tests.
http://www.theeeworks.org/ .

Environmental Ethics Case Studies
The American Physiological Society has created a wide range of teaching resources, and this webpage links to environmental ethics case studies covering everything from GMOs to the fluoridation of drinking water. Check out Reviving Extinct Species, Levees: Love 'Em or Lose 'Em, and more.
http://www.apsarchive.org/collection.cfm?collectionID=2385

Environmental Ethics Curriculum
Environmental Ethics: Examining Your Connection to the Environment and Your Community is a new curriculum geared towards middle and high school. It includes teacher and student guides aligned to national education standards and is organized by major topics: environmental ethics, air, water, forests, wildlife and minerals. The curriculum guides are free to download. A companion video series is available for a nominal cost.
http://www.envethics.org/

Environmental Film Festival - California
The 2006 Wild and Scenic Environmental Film Festival, *Lights! Cameras! Environmental Action!,* January 13-16, 2006 in Nevada City, California, will feature an array of award-winning films and discussions about restoration projects, climate change, and ocean protection issues.
http://www.wildandscenicfilmfestival.org/

Environmental Film Festival - Washington DC
The 13th annual Environmental Film Festival in the nation's capital, March 10-20, 2005, in Washington, DC, will screen 90 documentary, feature, animated, archival, and

children's films. Screenings are enhanced by discussion with scientists and filmmakers, and many are free. The complete film schedule will be posted on the website later this month. The 2013 Environmental Film Festival will take place March 12-24.
http://www.dcenvironmentalfilmfest.org/index.html

Environmental Funds Tool Kit
The Environmental Funds Tool Kit is an on-line resource that includes legal documents, manuals, plans, and communication materials in original languages for 30 funds, along with a consultant database. The goal is to help guide the creation and start-up of new funds, promote best practices for existing funds, and increase the efficiency and effectiveness to secure, and expend, reliable funding streams for biodiversity conservation
http://toolkit.conservationfinance.org/

Environmental Health Resources
National Environmental Education Week is continuing to expand their online curricula library and has just added links to lessons on environmental health. Materials range from water and air quality through the spread of infectious diseases to societal issues and much more. While on the website, check out the expanded listing of lessons and other materials in the library, including lessons on climate change and energy, green reading, newsletters, and more.
http://www.eeweek.org/resources/environmental_health_curricula.htm

Environmental History Modules for Teachers
The Environmental Literacy Council, with the support of the National Endowment for the Humanities, has produced a set of professional development modules in environmental history for high school teachers. Their goal is to provide teachers with resources linking fundamental historical concepts to important environmental issues. Modules include War and the Environment; Urbanization; Ordinary Landscapes; and more.
http://www.enviroliteracy.org/subcategory.php/314.html

Environmental History Resources
Professor Jan Oosthoek at the University of Edinburgh maintains this website to provide a range of resources and information on environmental history for the general public and scholars. Resources include bibliographies, essays, annotated guides to other web resources, a news feed, and more.
http://www.eh-resources.org/index.html

Environmental Impacts of Hurricane Katrina
NOAA offers this website with links to some of the projects they are currently working on throughout the region as they assess the marine environmental impacts of Katrina. Projects include assessments of the marine mammal and turtle health, harmful algal blooms monitoring, socioeconomic impact assessment, and more. There is also an interactive GIS mapping link.
http://www.st.nmfs.noaa.gov/hurricane_katrina/

Environmental Inquiry from Cornell University
Environmental Inquiry is a website and curriculum series developed at Cornell University to help students conduct environmental science research and participate in communities of fellow student scientists. Students learn specific research protocols and then conduct interactive research projects. The four-part Cornell Scientific Inquiry Series includes

Watershed Dynamics, Assessing Toxic Risk, Invasion Ecology, and Decay and Renewal.
http://www.dnr.cornell.edu/ext/Ext/NATURAL%20RESOURCES%20PUBLICATIONS.pdf
http://ei.cornell.edu/ .

Environmental Internship Clearinghouse Portal
As an extension of the National Council for Science and the Environment's (NCSE) Campus to Careers program, NCSE has created an environmental internship clearinghouse. The clearinghouse enables university students to search for internships in the environmental field and provides a forum for internship providers to tap into a solid community of quality applicants. Check this out.
http://environmentalinterns.ncseonline.org/

Environmental Literacy Council
The Environmental Literacy Council has assembled top scientists, scholars, economists, and educators to provide direct support to local teachers. Expert advisors provide practical teaching resources in a wide variety of projects, available both in print and online. The website offers the following sections with background information and educational materials: air and climate, land, water, ecosystems, energy, food, environment and society.
http://www.enviroliteracy.org/index.php

Environmental Literacy in the United States
The National Environmental Education Foundation has published Environmental Literacy in the United States - An Agenda for Leadership in the 21st Century. The report offers examples of how people can understand their relationship to the environment; learn how to be environmentally responsible; and become inspired and motivated to act on this knowledge.
http://neefusa.org/environmental-literacy.htm

Environmental News on Facebook
P1 Marine Foundation is a registered charity dedicated to promoting the conservation, protection and restoration of marine and coastal environments through public awareness and education. They have opened a facebook portal for environmental and oceanic news, discussions, and more.
http://www.facebook.com/pages/P1-Marine-Foundation/161281850573326

Environmental Pathways – Youth Investigating Pollution Issues in Illinois
The Illinois EPA offers *Environmental Pathways – Youth Investigating Pollution Issues in Illinois*, a downloadable teacher's guide for grades 5-6. The guide meets the criteria of NAAEE's Environmental Education Materials: Guidelines for Excellence and is correlated with the Illinois Leaning Standards. The packet is designed to develop critical thinking skills, encourage students to think constructively about environmental issues, and to make informed decisions about our natural resources.
http://www.epa.state.il.us/kids/teachers/environmental-pathways/index.html

Environmental Performance Index
The *Pilot 2006 Environmental Performance Index* provides benchmarks for current national pollution control and natural resource management results. The issue-by-issue and aggregate rankings facilitate cross-country comparisons both globally and within

relevant peer groups. It establishes specific targets for environmental performance and measures how close each country comes to these established goals.
http://www.yale.edu/epi/

Environmental Posters
The Loxahatchee River District offers a series of environmental poster series, Lionfish, Coral Reefs, Seagrasses, Eastern Oyster, Bonefish, Tarpon, and Land Crab. The posters focus on the importance of habitat preservation and fisheries management. The posters can be downloaded from the website.
http://www.loxahatcheeriver.org/resources.php

Environmental Research and Education Needs
The National Council for Science and the Environment has released a new report, Environmental Research and Education Needs: An Agenda for a New Administration. It identifies research needed to improve scientific knowledge, and education needed to improve public understanding, professional capacity, and a strong workforce.
http://ncseonline.org/NCSEconference/

Environmental Response Management Application
NOAA offers this public website that delivers near-real-time information in map format about the response to the Deepwater Horizon BP oil spill. The online mapping tool is designed specifically for response activities where it is necessary to coordinate with various federal, state, and local agencies. ERMA is a web-based GIS platform integrating the latest data on the oil spill's trajectory, fishery closed areas, wildlife, and place-based Gulf Coast resources into one customizable interactive map.
http://gomex.erma.noaa.gov/

Environmental Science Interactive
Environmental Science Interactive is a set of 14 online laboratories used to complement a traditional lecture course, turning it into a lecture plus lab course. Topics include water resources, atmosphere and climate, policy and decision-making, and much more. For a limited time, they offer free access for instructors.
http://www.webschoolofscience.com/EnvScience.php

Environmental Science Labs and Activities
The Environmental Literacy Council offers labs which have been developed by an experienced team of environmental science educators and subjected to peer review. The content of the collection is varied, and each contains an inquiry-based component. They include a Tragedy of the Commons simulation, air quality monitoring, primary productivity, a coastal resources debate, and more.
http://www.enviroliteracy.org/subcategory.php/243.html

Environmental Science Programs
EnvironmentalScience.org offers lists of environmental science education programs, careers, and more. The Resources link offers information about internships and scholarships.
http://www.environmentalscience.org/
.

Environmental Science Teacher Exchange
The Environmental Literacy Council's website teacher exchange allows educators to share labs, activities, and ideas with colleagues online. The topics are drawn from the

College Board's suggested labs and field investigations for the AP environmental science course. There are lesson plans, classroom curricula, and an AP Environmental Science course outline. Find the marine-oriented offerings under *Teaching Resources*.
http://www.enviroliteracy.org/category.php/17.html

Environmental Science: Understanding Our Changing Earth Curriculum – Request for Pilot Teachers
The American Geological Institute seeks up to 12 experienced science teachers in grades 9 through 12 to pilot test their comprehensive *Environmental Science: Understanding Our Changing Earth* curriculum in the fall semester of the 2004-2005 school year. The draft outline of curriculum and chapter headings are on the website and include watersheds and coastal processes.
http://www.agiweb.org/education/hses/pilottest/index.html .

Environmental Service Projects
Youth Service America offers this downloadable resource with 55 different environmental service learning projects, along with links to related resources and websites. It is available in English, Spanish, and Portuguese. You can also browse online by issue area, project leader type, and type of practice.
http://www.ysa.org/55_environmental_service_projects_featured

Environmental Sociology
Environmental Sociology brings together the tools of social sciences and applies them to key issues affecting our society. The Section on Environment and Technology of the American Sociological Association provides a home for sociologists interested in these issues. They distribute a quarterly online newsletter and offer expert contact information, resources for a Climate Change Teach-In, and much more.
http://www.envirosoc.org/

Environmental & Sustainability Lessons
The LASER (Leadership & Assistance for Science Education Reform) and Washington State Office of Superintendent of Public Instruction have upgraded three commonly used elementary science instructional materials with environmental and sustainability concepts. In addition, the upgraded lessons incorporate Native American stories related to science and sustainability.
http://www.wastatelaser.org/Instructional-Materials/environmental-sustainability-enhanced-lessons

Environmental Visualization Website
The NOAA Environmental Visualization Lab offers this website with video files, high resolution satellite images, and more. The animation gallery includes animations about tsunami debris, hurricanes, La Nina, the ocean bottom, and much more. For best viewing quality, it is recommended to download large video files locally and saving them to a local computer drive, rather than viewing them online.
http://www.nnvl.noaa.gov/

Envisioning Climate Change Using a Global Climate Model
Envisioning Climate Change Using a Global Climate Model explores one method climatologists use to model climate change. The unit visualizes how temperature and snow coverage might change over the next 100 years. Visitors run a control simulation to establish a baseline for comparison and then change variables to compare and

contrast the predicted outcomes. The website offers notes for educators, instructions, links to further information, and more.
http://serc.carleton.edu/eet/envisioningclimatechange/index.html

EOL iTunes University And Life on Earth iBooks
The Encyclopedia of Life offers two free iTunes U. The iTunes U Collection offers biodiversity educational materials, information, podcasts and Google Earth Tours. E. O. Wilson's Life on Earth iBooks Textbook for high school biology students created by the E. O. Wilson Biodiversity Foundation. The iTunes U course brings together content from the Smithsonian National Museum of Natural History, National Geographic, EOL, and other institutions with content emphasizing citizen science, climate change, and more.
http://eol.org/info/itunesu

EOL Memory Games
Check out the Encyclopedia of Life Species Matching Games. Users first match pictures of different highlighted species, and then connect them with their names. Play Barataria, Invertebrates, Amanita, and more. A fun place to spend time while learning something about each species.
http://fieldguides.eol.org/memory/index.php

EPA Data Finder
EPA recently launched DataFinder, a single place to find EPA's data sources so people can better access and understand environmental information. All of the data sources are available on the Internet and have been organized by topics such as water, air, and more. Visit the site, suggest new content, and comment on its functionality. EPA also will use Data Finder to discover raw data that can be accessed via Data.gov.
http://www.epa.gov/datafinder

EPA Earth Day Website
Earth Day, April 22, is quickly approaching. Check out EPA's Earth Day website for lesson plans and more. Check out the Environment in a Day photo project, Pick 5 for the Environment, and more.
http://www.epa.gov/earthday/

EPA EE Materials
The EPA has streamlined the ordering of environmental education materials for classrooms. The order forms list materials grouped by grade range and offers a picture of the item, title, brief description, and the quantity limit that can be ordered.
http://www.epa.gov/nscep/teaching_aids.html

EPA Kids
The EPA sponsors the Environmental Kids Club to get young children interested in learning more about the environment and to encourage their involvement in environmental projects. The website offers links to many categories, including Air, Water, You & Your Environments, a Game Room, Art Room, and more.
http://www.epa.gov/kids/

EPA Office of Solid Waste Educational Resources
This site provides materials to help develop an increased knowledge of solid waste issues and inspire participation in environmental activities. The site includes activities and project ideas to learn more about waste reduction, reuse, and recycling. Information

sources, tools, and data enable student researchers to collect environmental information for use in projects and reports. Curriculum, activities, games, student award and grant information, and career information are also provided.
http://www.epa.gov/epaoswer/education/index.htm

EPA Public Involvement Tools and Techniques Website
The US Environmental Protection Agency's public involvement web pages have been expanded to include new materials and links to useful information about tools and techniques in use all over the world. The site also includes a new feedback section with ready-to-use surveys. In addition, the Public Involvement Resources and Training database, previously on EPA's Intranet, is now publicly available for use.
http://www.epa.gov/publicinvolvement

EPA Science Notebook
The EPA Science Notebook website showcases EPA science and scientists using assorted multi-media, including science blogs, videos, interviews, and more. A scientist's notebook is home to ideas, questions, drawings, and data and offers information about the scientific process. The website aims to make scientists and their research more accessible, understandable, and interesting to the public.
http://www.epa.gov/sciencenotebook/

EPA Student Resources
The EPA student website offers links to many useful resources for students and teachers. Categories include games and quizzes, teacher resources, homework help, and more.
http://www.epa.gov/students/

EPA Wastes Website
This website from the EPA provides materials for teachers, students, and researchers to develop an increased knowledge of solid waste issues. The resources are divided into four sections: What You Can Do, Resource Conservation, Hazardous Waste, and Nonhazardous Waste. Students can find activities and project ideas, data to collect environmental information for use in projects and reports. The website also offers links to curriculum, games, and more, along with grant and career information.
http://www.epa.gov/epawaste/index.htm

EPA Water Quality Booklet
The kids' water quality booklet, *What's Up with our Nation's Waters?* (EPA 841-F-02-002), is ready for distribution. Order individual copies from NSCEP at 1-800-490-9198 or request larger quantities by email at ncepiwo@one.net. The website highlights earlier versions.
http://www.epa.gov/owow/monitoring/nationswaters/

EPA Water Webpage for Kids
A new Kids Page has debuted on the Environmental Protection Agency's Office of Water website. The site contains games, activities, and animated classroom experiments, following along with a new character called "Thirstin". Teachers and students can work on-line or download some of the information for classroom use. Check out the interactive water cycle, and the *Aquifer in a Cup* activity.
http://www.epa.gov/safewater/kids/index.html

EPIC805
EPIC805 (Environment in the Public Interest Crowdsourcing, area code 805) is a public trust resource watch network seeking to locate, document, and inform appropriate agencies to resolve observed environmental problems in Morro Bay, California. The project trains university students and community volunteers to patrol the bay via dockwalking or kayak, and to use smartphones to visually record pollution violations. The program provides an alternative to formal enforcement.
http://www.case-1.org/news/19-crowdsourcing-san-luis-obispo-s-mpas

Erase the Waste Action Kit
From the California State Water Resources Control Boards' comes the Erase the Waste campaign, providing a number of resources and information on simple every day actions steps to stop pollution at the source. It includes tips on creating a trash-free cleanup event, adopting your local park or neighborhood as a trash-free zone. Also included are materials about pollution prevention, sample media materials, and a directory of additional resources. Available in English, Spanish, Chinese, Korean, and Vietnamese.
http://www.erasethewaste.com/ .

EROS Image Gallery Collections
This collection of images from USGS' Earth Resources Observation and Science division, records events of historic significance, beautiful sights, and images that stir the imagination. Check out the ongoing series, Earth as Art (now on collection 3); the Image of the Week with side-by-side satellite images from different dates; and more. The images can be downloaded, or a hard copy ordered from the USGS. Note that free registration may be required for downloading and the files may be large.
http://eros.usgs.gov/imagegallery/

ES 2000: Endangered Species of the Next Millennium
This student-designed website provides an overview of endangered species issues, including definitions, background on biological classification, and history of extinction. The website outlines causes of population decline and provides case studies. There is an A-Z listing of endangered species, multimedia, facts, and more.
http://library.thinkquest.org/25014/english.index.shtml

ESRI Map Book Offer
ESRI, a GIS software company, offers copies of the ESRI Map Book Volumes 16 and 17 for the cost of shipping only, $3.00 per book. Volume 16, *Geography—Creating Communities*, reproduces color digital maps produced in 2000, including images of seafloor topography and geologic analysis of Mars and Venus. Volume 17, *Geography and GIS--Sustaining Our World* features stories from more than 20 disciplines.
bmanion@esri.com

Essential Energy Information
This website from the National Academies features essential energy information. The site presents facts about America's current energy system in four main topics: energy uses, sources, costs, and efficiency. The website offers an energy quiz, a glossary, and an extensive source library.
http://www.needtoknow.nas.edu/

Essential Fish Habitat Mapper and Data Inventory
NOAA announces the launch of the enhanced Essential Fish Habitat (EFH) Mapper and data inventory. The new mapping tool features data on EFH areas protected from fishing, including anchoring restrictions, fishing gear modifications, and bans on certain types of gear, among others.
http://www.habitat.noaa.gov/essential-fish-habitat-mapper.html

Essential Lens: Analyzing Photographs Across the Curriculum
Essential Lens: Analyzing Photographs Across the Curriculum is a multidisciplinary resource for middle and high school teachers from Annenberg Learner. It offers practical methods to facilitate the use of photographic materials in classroom settings. The website hosts rights-cleared photos curated by topic; videos; lesson plans; and an interactive tool for analyzing photos.
http://www.learner.org/courses/lens/

Essential Science for Teachers from the Annenberg/CPB Channel
Life Science, premiering March 3rd on the Annenberg/CPB Channel, is the first in a three-part course series *Essential Science for Teachers*. These courses help K-6 teachers understand science concepts needed to teach a standards-based curricula. Real-world examples, demonstrations, animations, still graphics, and interviews with scientists enrich content segments. Upcoming modules includes *Variation, Adaptation, and Natural Selection*; *Material Cycles in Ecosystems*; and others.
http://www.learner.org/redirect/february/lifescience1.html .

Essentials of Geology
Designed to complement a geology textbook, this website includes animations, interactive crossword puzzles, and news articles; many of the materials can be used as stand-alone exercises. The animations cover the Earth's magnetic field, the spread of the sea floor, the formation of ocean crust, and more.
http://www.wwnorton.com/college/geo/egeo/welcome.htm

Establishing Marine Protected Area Networks
The IUCN World Commission on Protected Areas (WCPA-Marine) has released a new guidebook summarizing key points in building MPA networks. The 16-page guide, *Establishing Marine Protected Area Networks: Making It Happen*, offers a concise synopsis of factors necessary for effective network design, including ecological criteria, best practices for planning, and other considerations. It is intended to show briefly how to transform policy aspirations into practical action, and is not meant to be exhaustive. A full technical report to flesh out the summary report's framework is expected to be released later in 2007.
http://www.iucn.org/themes/wcpa/biome/marine/mpanetworks/networks.html

Establishing Resilient Marine Protected Area Networks
Establishing Resilient Marine Protected Area Networks - Making It Happen is a new document that provides guidance for designing and implementing effective MPA networks. The guide contains information for MPA planners, managers, and conservation practitioners about the role of MPA networks in achieving marine conservation goals.
http://blog.protectplanetocean.org/2008/10/new-global-best-guidance-released-on.html

Estuaries 101 Curriculum
NOAA's National Estuarine Research Reserve System offers Estuaries 101, an on-line science curriculum designed for grades 9-12 classrooms. Students learn fundamental concepts in science, develop scientific thinking skills, and explore the nation's biologically rich and economically important estuaries. From flying over an estuary with Google Maps to tracking the path and impact of a hurricane, Estuaries 101 modules feature hands-on learning, experiments, field-based activities, and data explorations.
http://www.estuaries.gov/estuaries101/Teachers/Home.aspx

Estuaries 101 Middle School Curriculum
The National Estuarine Research Reserves' Estuaries 101 Middle School Curriculum is a multi-media online science curriculum offering students virtual field trips to estuaries around the country. The curriculum provides interactive learning tools that teach fundamental concepts in science and develop scientific thinking skills. Topics include Human Impact, Natural Resources, Research & Monitoring, Abundance of Life, and Dynamic Ecosystems.
http://estuaries.noaa.gov/Teachers/Home.aspx

Estuaries in Balance
The International Crane Foundation hosts the interactive program for grades 4-8, called Estuaries in Balance: The Texas Coastal Bend. It explores topics of biodiversity, habitat quality, and watershed management while highlighting how Whooping Cranes, blue crabs, redfish, and oysters depend on healthy estuaries. Please send feedback about the program to Cathy Wakefield at CWakefield@savingcranes.org.
http://www.savingcranes.org/estuaries-in-the-balance.html

Estuaries and Coasts, Hurricane Edition
Estuaries and Coasts, the Journal of the Estuarine Research Federation, volume 29(6A) is dedicated to papers about the individual and cumulative effects of hurricanes on coastal ecosystems. The special issue is open access. In addition, many other full text articles from other issues are available on the website for free.
http://estuariesandcoasts.org

Estuaries Discovery Kit
NOAA's National Ocean Service Communications and Education Division offers the Estuaries Discovery Kit. The kit explores how estuaries are classified, the various ecosystem services estuaries perform, how organisms have adapted to estuarine environments, human impacts, and the work that the National Estuarine Research Reserve System and its partners conduct to monitor, preserve, and restore estuarine ecosystems throughout the United States.
http://oceanservice.noaa.gov/education/kits/estuaries

Estuaries.Gov
The revamped Estuaries.Gov site is a hub for exploration and discovery of our nation's estuaries. In addition to the Estuaries 101 Curriculum and links to other educational materials, students and educators can access videos; animated interpretations and other easy-to-use visualizations; fact sheets on threatened estuarine species, including a picture of the species, a range map, quick facts, conservation notes, and life history information; scientific and educational reports; and estuarine news.
http://www.estuaries.gov/

Estuarine Aquarium Keeping for Beginners
This is a beginner's guide to keeping brackish water marine life in aquariums. Topics include basic aquarium supplies and set-up for novices; operation and maintenance; monitoring water quality; estuarine animals suitable for beginners, and more.
http://www.vims.edu/cbnerr/_docs/education_docs/EstAquKeepwriteup.pdf

Estuarine Geospatial Data
NOAA offers downloadable data sets to help your students study estuaries around the U.S. Check out Estuarine Bathymetry and the Coastal Geospatial Data Project, offering bathymetric data sets, shorelines, salinity, shellfish growing areas, and more.
http://estuarinebathymetry.noaa.gov/
http://coastalgeospatial.noaa.gov/

Estuary Condition Reports
The National Estuary Program Coastal Condition Report presents the condition of 28 estuaries covered by National Estuary Program (NEP) based upon data collected as part of EPA´s National Coastal Assessment program and data collected by individual NEPs or by NEPs in partnership with interested stakeholders, including state environmental agencies, universities, or volunteer groups. The National Coastal Condition Report series describe the condition of 100% of all estuaries in the contiguous 48 states.
http://www.epa.gov/owow/oceans/nepccr/index.html

Estuary Video Gallery
NOAA's National Estuarine Research Reserve Estuary Video Gallery offers a collection of short video clips which can be the next best thing to an actual field trip to an estuary. There are over 150 video clips covering a range of topics. Content is categorized into themes of Estuaries & You, Life in an Estuary, Protect & Restore, Science & Technology, and K – Elementary.
http://estuaries.gov/Estuarylive/VideoGallery.aspx

EstuaryLive! 2009
EstuaryLive! will take place May 1 and May 15, 2009 with an annual, free, live, interactive, field trip through our nation's estuaries. This year's program will feature six 30-minute segments broadcasting live from three of NOAA's National Estuarine Research Reserves. The broadcasts will include a discussion of the impacts of global climate change on our coastal ecosystems. For those who can't watch the live broadcasts, check out the archives. Share your projects on the estuary wiki, and check out the extensive archives and video collection. Make sure to check your technology connections beforehand, to make sure you can join the full broadcast.
http://estuarylive.pbworks.com/
http://www.estuaries.gov/

EstuaryLive 2006
Preparations have begun for the September 29, 2006 EstuaryLive Internet broadcast, and educators are invited to sign up for this year's event. EstuaryLive is hosted by the National Estuarine Research Reserve (NERR) System in collaboration with the National Estuary Programs. This year four field trips will be offered:

- New York - New Jersey Harbor Estuary Program, New Jersey
- Padilla Bay NERR, Washington State
- Peconic National Estuary Program, Long Island, New York

- South Slough NERR and Tillamook Bay National Estuary Program, Oregon

www.estuaries.gov

Estuary Live: 2004
National Estuaries Day is a Coast Week celebration to promote the importance of estuaries and the need to protect them. This year's program will include field trips to seven estuaries: Puget Sound, Slough Slough, Weeks Bay, Rachel Carson Reserve, Great Bay, Peconic Estuary, and Waquoit Bay. Visit the website for the education topics and standards; additional information and teaching materials will be posted soon.
www.estuaries.gov .

Estuary Live! 2003
National Estuaries Day, an interagency campaign to promote the value of estuaries and the need to protect them, was celebrated September 27, 2003. The feature event for National Estuaries Day is *EstuaryLive*, an interactive Internet journey through estuaries for students of all ages. Naturalists and students tour different estuaries, and web participants interact with the tour guides by emailing questions during the field trips.
www.estuaries.gov and http://www.estuarylive.org/

Estuary Live - Celebrate National Estuaries Day 2004
Take your students on a tour of estuaries of the United States by participating in the EstuaryLive interactive webcast. National Estuaries Day, September 25, 2004, is an annual celebration of the magical places where fresh water from rivers mix with salt water from the ocean. EstuaryLive kicked off the celebration on September 23 and 24 by bringing free, live, interactive, Internet field trips in seven different estuaries around the country right to your classroom.
www.estuaries.gov

Estuary Live! 2005
Take a live, interactive virtual field trip to the Rachel Carson Site of the North Carolina National Estuarine Research Reserve with a trained naturalist as your guide via a live Internet connection. Visit four uninhabited islands and salt marshes located off Beaufort, North Carolina, May 3-5, 2005. The broadcast will feature topics including blue crabs, oysters, water quality, coastal geology, weather, decoy carving, and sand sculpture. Lesson plans and images are available on-line.
http://www.estuarylive.org/

EstuaryLive 2005
Celebrate National Estuaries Day by taking a free, interactive field trip over the Internet on September 22 and 23, 2005. Naturalists from the National Estuarine Research Reserve System and the National Estuary Programs will take participants on guided tours through:

- Tillamook Bay National Estuary Program, Oregon
- New York-New Jersey Harbor Estuary Program, New Jersey
- Grand Bay National Estuarine Research Reserve and Mobile Bay National Estuary Program, Alabama
- Jacques Cousteau National Estuarine Research Reserve and Barnegat Bay National Estuary Program, New Jersey
- San Francisco Bay National Estuarine Research Reserve, California

http://www.estuaries.gov/elive.html

EstuaryLive 2006
Tune into EstuaryLive on September 29, 2006. This year's field trips will feature segments on crabs, salmon, turtles, birds, salt marshes, habitat restoration and much more. The broadcast schedule for this year's field trips will be as follows (all times are EST); archives will also be available for these and previous field trips:

- Peconic National Estuary Program, New York, 11:00 am-12:05 pm
- New York - New Jersey Harbor Estuary Program, New York, 12:10-1:15 pm
- South Slough NERR and Tillamook Bay National Estuary Program, Oregon, 1:20-2:25 pm
- Padilla Bay NERR, Washington State, 2:30-3:35 pm

http://www.estuaries.gov

Estuaries Discovery Kit and Tutorial
The Estuaries Discovery Kit, from NOAA's National Ocean Service and National Estuarine Research Reserve System educators, contains a 12-page tutorial on estuarine habitats, the threats facing them, and efforts to monitor and protect estuaries nationwide. The tutorial includes photographs, videos, illustrations and interactive graphics to enhance the text and bring understanding to concepts that may be difficult to visualize. A roadmap provides additional links to online data resources and formal lesson plans.
http://oceanservice.noaa.gov/education/kits/estuaries/

Estuaries SciGuide
The Estuaries SciGuide is an on-line resource which can help your students discover why estuarine environments are so unique; how they interact with the surrounding environment; the effects humans and estuaries have on each other; and more. The SciGuide can save you time by providing resources that have been pre-evaluated and aligned to the National Science Education Standards. The Estuaries SciGuide is free; registration is required.
http://learningcenter.nsta.org/product_detail.aspx?id=10.2505/5/SG-21

EurekaAlert! Marine Science Portal
The American Association for the Advancement of Science (AAAS) has an online news service called EurekAlert! The online Marine Science Portal includes a calendar of events, links to marine science resources, press releases, and more. It offers marine science information from universities, research institutes, and other organizations engaged in all aspects of marine science research.
http://www.eurekalert.org/marinescience/ .

European Marine Science Educators Association Resources
The European Marine Science Educators Association (EMSEA) is a non-profit organization which provides a platform for ocean education and promoting ocean literacy within Europe. The website offers an extensive list of marine education links. They have also organized a Facebook group to provide an informal forum for educators to share marine education ideas and experience in Europe and around the world.
http://www.emsea.eu/
https://www.facebook.com/groups/460137674027494/?fref=ts

Eutrophication and Hypoxia Website
World Resources Institute in collaboration with the Virginia Institute of Marine Science support the website, Eutrophication & Hypoxia: Nutrient Pollution in Coastal Waters. The website offers an interactive map of eutrophic and hypoxic areas worldwide, along with photos and videos linked to the site, news, a resource library, and more.
http://www.wri.org/project/eutrophication

Evacuteer.org
Evacuteer is charged with helping people leave Louisiana if they're forced to evacuate. The group's projects include evacuation training, social media campaigns, and public art installations which will double as evacuation pick up points. Check out the website to see if similar planning might work for your community.
http://evacuteer.org/

Every Drop Counts
Facing the Future presents *Every Drop Counts*, a series of water-related lessons beginning with a water trivia game and a short demonstration of how much of Earth's water is available for human and other species' needs. The series includes a "water walk" and a personal water-use audit. It is designed for use in middle and high school classrooms and is available as a free download. Check out the other free materials on the website.
http://www.facingthefuture.org/Curriculum/DownloadFreeCurriculum/tabid/114/Default.aspx

Every Kid in a Park Initiative Webinars
The "Every Kid in a Park" initiative will offer 4th grade students and their families free admission to federal lands and waters for a year. A webinar will be held three times during the month of August; register for an upcoming webinar for complete details. The Every Kid in a Park pass will be available for the 2015-2016 school year.
http://www.ysa.org/every_kid_in_a_park_initiative_webinars

Evotis
Evotis is a quarterly online publication by the University of California Davis One Health Institute, which is home to the Wildlife Health Center. Each volume focuses on a central theme that highlights the center's work. Volume one is *Wings*; volume two is *Coastlines*.
http://www.evotis.org/

Excellence in Environmental Education – Guidelines for Learning
NAAEE has revised and reprinted Excellence in Environmental Education – Guidelines for Learning (Pre K-12) and its companion publications, Excellence in Environmental Education – Guidelines for Learning (Pre K-12) Executive Summary and Self Assessment Tool. The guidelines provide a common framework for promoting environmental literacy and support state and local environmental education efforts by setting expectations for performance and achievement in grades 4, 8, and 12.
http://naaee.org/pages/npeee/

Executive Order for the Stewardship of Our Oceans, Coasts, and Great Lakes
President Barak Obama signed an Executive Order establishing the National Ocean Council. The Executive Order established for the first time a comprehensive, integrated national policy for the stewardship of the ocean, our coasts, and Great Lakes, which sets

our nation on a path toward comprehensive planning for the preservation and sustainable uses of these bodies of water.
http://www.whitehouse.gov/administration/eop/oceans

Excellence in Earth Science Education
The American Geological Institute's Education Department has created a portfolio of geoscience educational materials and resources for students and teachers. Resources include curriculum, professional development, and more. Check out Earth's Fluid Spheres, a module covering oceans, atmosphere, and cryosphere (glaciers). Other modules include plate tectonics, water resources, land use planning, and more.
http://www.agiweb.org/geoeducation.html

Expedition 329: South Pacific Gyre Microbiology
From October 9-December 13 2010, an international team of scientists sailed on the scientific drilling vessel *JOIDES Resolution* for an expedition to the South Pacific to define the physical and chemical limits of subseafloor microbial life in tectonic and oceanographic settings not yet explored. Explore the expedition through archived weekly blogs, podcasts, and more. Check out Adopt a Microbe, the games, and more.
http://joidesresolution.org/node/1412

Expedition 342 Paleogene Newfoundland Sediment Drifts
Follow along with scientists on the JOIDES Resolution Expedition 342: Paleogene Newfoundland Sediment Drifts, June 2-August 1, 2012. The website will host mission blogs, videos, links to educational resources, and more. Schedule a live video broadcast with your students or other groups; sign up today.
http://joidesresolution.org/node/2492

Expedition 344: Costa Rica Seismogenesis Project
Follow along with scientists on the *JOIDES Resolution* Expedition 344: Costa Rica Seismogenesis Project, October 23-December 11, 2012. The website will host mission blogs, videos, links to educational resources, and more. Schedule a live video broadcast with your students or other groups; sign up today.
http://joidesresolution.org/node/2677

Expedition 346: Asian Monsoon
Join the crew of the JOIDES Resolution on Expedition 346: Asian Monsoon as they explore the development and evolution of monsoon patterns and their relationship to past changes in the Japan sea, July 29-September 28, 2013. Teachers can sign up for 30-45 minute live interactions through Skype or Zoom, where your students can get a tour of the labs, see what the latest discoveries are, and ask questions of scientists.
http://joidesresolution.org/node/2737
https://docs.google.com/spreadsheet/viewform?formkey=dEJ1S19IdF9TLTNuR1dRN3l3ekVnUWc6MA#gid=0

Expedition 349: South China Sea Techtonics
Join the crew of the *JOIDES Resolution* on Expedition 349: South China Sea Techtonics, January 26-March 30, 2014 as they explore the formation of the South China Sea. Teachers can sign up for 30-45 minute live interactions through Skype or Zoom, where your students can get a tour of the labs, see what the latest discoveries are, and ask questions of scientists.
http://joidesresolution.org/node/2737

https://docs.google.com/a/noaa.gov/spreadsheet/viewform?usp=drive_web&formkey=dFNpZlV2bndvd0hkcXFLdkp0Zk5JRUE6MA#gid=0

Expedition 350: Izu Bonin Mariana Rear Arc Expedition
Join the *JOIDES Resolution* March 30-May 30 2014 for the Izu Bonin Mariana Rear Arc expedition. The education program will focus on this exploration, the nature and process of science, and careers. Video broadcasting is available April 4-May 28, 2014. Requests for 30-45-minute Zoom interactions are handled on a first come, first served basis.
http://joidesresolution.org/node/3393

Expedition 351: Izu Bonin Mariana Rear Arc Expedition
Join the *JOIDES Resolution* May 30-July 30, 2014 for the Izu Bonin Mariana Rear Arc Origins expedition. The education program will focus on this exploration, the nature and process of science, and careers. Sign up for live interactions with your group; sessions are free but the number of slots are limited.
http://joidesresolution.org/node/3389

Expedition 353: Indian Monsoon
Sign-ups are now open for Expedition 353 JR Live interactive ship-to-shore events with the *JOIDES Resolution*, a research vessel dedicated to scientific ocean drilling. The expedition focuses on the development of monsoons in the Bay of Bengal region. The expedition runs from November 29, 2014–January 29, 2015.
http://joidesresolution.org/node/3759

Expedition 355: Arabian Sea Monsoon
Follow along with the *Joides Resolution*, March 31-May 31, 2015. The Arabian Sea Monsoon Expedition aims to study the interaction between the Himalayas and Tibetan plateau uplift and the development and evolution of the Indian summer monsoon. Sign up now for live ship-to-shore video interactions with the scientists on board. Events are free but spaces are limited.
http://joidesresolution.org/node/3958

Expedition 363 Western Pacific Warm Pool
Opportunities exist for researchers (including graduate students) in all specialties to sail aboard the *JOIDES Resolution* September 30-November 30, 2015. Expedition 363 aims to understand the interaction between climate and the Western Pacific Warm Pool from the middle Miocene to Holocene. The deadline for application is August 15, 2015. Be sure to visit the *Joides Resolution* website to follow along during the research cruise. Teachers can sign up for live video broadcasts for their classes.
http://iodp.tamu.edu/scienceops/expeditions/pacific_warm_pool.html
http://joidesresolution.org/

Expedition: Blue Planet
Expedition: Blue Planet highlights a journey across 5 continents to explore critical water issues, focusing both on water itself and our connection to water issues around the world. The website includes blogs, photos, and more.
http://www.alexandracousteau.org/

Expedition Blue Planet 2010
Expedition Blue Planet 2010 is a 138-day interactive exploration of critical water issues across the U.S., Canada, and Mexico. In addition to filming a range of critical water issues on the Colorado River, Gulf Coast, Tennessee Valley, Great Lakes and Chesapeake Bay, the expedition will stop in 20 communities along the route to host watershed action days. Follow along through the blogs, photos, and videos on the website.
http://www.alexandracousteau.org/

Expedition Chesapeake
On June 24, 2005, a group of students from Rockingham County, Virginia, embarked on a unique, educational, 30-day journey with the Chesapeake Bay Foundation. Sixteen upcoming juniors and seniors from Turner Ashby High School are paddling 355 miles, from their home town at the beginning of the South Fork of the Shenandoah River to Tangier Island, Virginia. Follow the journey online through the students' own journal entries and photographs, posted and updated regularly on the website.
www.baybound.org

Expedition to the Deep Slope
Now available on NOAA's Ocean Explorer website is the *Expedition to the Deep Slope* mission, the first systematic exploration of hydrocarbon seep communities deeper than 1000 meters in the Gulf of Mexico. The scientific team includes geologists and geochemists working alongside microbiologists, physiologists, and ecologists to maximize what can be learned about the deep Gulf of Mexico cold seeps and coral communities.
http://www.oceanexplorer.noaa.gov/explorations/06mexico/welcome.html

Expedition to the Deep Slope 2007
The 2007 Expedition to the Deep Slope expedition, June 4-July 6, 2007, continues the exploration and study of hydrocarbon seep communities deeper than 1000 meters in the Gulf of Mexico. Funded by the Minerals Management Service, a leader in supporting the scientific characterization of seep communities in the Gulf of Mexico, and the NOAA Ocean Exploration program, a diverse team of scientists will be using the ROV Jason II and the NOAA ship *Ronald Brown*.
http://www.oceanexplorer.noaa.gov/explorations/07mexico/welcome.html

Expedition: Insects
This e-book from the Smithsonian Science Education Center helps students (grades 3-5) explore characteristics of six different of insects in natural habitats around the world. Download an interactive version of the e-book for free on iBooks or read the non-interactive PDF version online. The website offers additional resources.
http://www.ssec.si.edu/books/expedition/insects

Expedition to the Remote Northwestern Hawaiian Islands
Scientists conducted an expedition to the Papahanaumokuakea Marine National Monument from July 7-31, 2007. Researchers tagged apex predators such as jacks, sharks, and grey snapper, conducting movement studies. The research will help inform management of this marine national monument, by studying the health of the coral reef and inhabitants in this remote ocean wilderness. Check out the educational resources.
http://www.hawaiianatolls.org/research/July2007/index.php

Expedition Susquehanna
The month-long journey by canoe highlighted the role that the vast Susquehanna River, the largest tributary of the Chesapeake Bay, plays in the health of the nation's largest estuary. The Chesapeake Bay Foundation offers the on-line WebQuest, Expedition Susquehanna, where students can virtually paddle alongside the expedition crew on a journey 444 miles from the Susquehanna River's headwaters in Cooperstown, New York to the Chesapeake Bay in Maryland to investigate water quality and land use.
http://www.cbf.org/site/PageServer?pagename=back_pa_expsuskie_expedition

Expeditionary Learning
King Middle School in Portland, Maine has been refining its expeditionary learning projects for nearly two decades, and has developed Fading Footprints, a six-step rubric for designing a project. The Fading Footsteps project is a twelve-week interdisciplinary ecology unit centered around the guiding question: How does diversity strengthen an ecosystem? Using this project as an example, see how King Middle School creates an action plan around each step.
http://king.portlandschools.org/files/onexpedition/expeditionproducts/footprints/frameset/frame.htm

Experiment to Clean Up an Oil Spill
This experiment, created by the Australian Maritime Safety Authority, is designed to give kids an idea of what it might be like to clean up an oil spill and why the task is so difficult. Using environmentally-friendly household materials, the experiment guides students through the steps of creating an oil spill and then trying to clean it. A series of observational questions are posed.
http://www.amsa.gov.au/marine_environment_protection/Educational_resources_and_information/Teachers/Classroom_Projects/Clean_up_oil_spill_exercise.asp

Expert Voices Gateway
Expert Voices: Speaking of Something Interesting is a science teaching information exchange sponsored by the National Science Digital Library (NSDL) geared towards teachers of all levels, as well as students.. The topics covered are science, technology, engineering, and mathematics.
http://expertvoices.nsdl.org/

Expert Voices Weblog
The National Science Digital Library Expert Voices site provides the latest science news straight from the source: scientists. Expert Voices is a weblog site for experts in STEM and a forum for educational discussion about the latest STEM news. Moderated conversations are designed to tie NSDL resources to science news and add context for resources that enhance discovery, selection, and use.
http://expertvoices.nsdl.org/

Explaining Extreme Events of 2013 from a Climate Perspective
A new report from the Bulletin of the American Meteorological Society, Explaining Extreme Events of 2013 from a Climate Perspective, addresses the causes of 16 individual extreme events that occurred across four continents in 2013.
http://www.ametsoc.org/

Exploratorium: Explore Earth
This website from the Exploratorium offers links to a range of Earth science subjects as visitors explore the Antarctic, turbulent landscapes, science and art, and more. Be sure to check out additional topics including Culture, Living Things, and more.
http://www.exploratorium.edu/explore/earth

Exploration of the Gulf of Mexico 2014
NOAA's Office of Ocean Exploration and Research launched the NOAA Ship *Okeanos Explorer*: Exploration of the Gulf of Mexico 2014: Leg 1 and Leg 2 during February and March, 2014. Check out the archived information, including mission overviews, an education module, and more. NOAA Ship Okeanos Explorer: Exploration of the Gulf of Mexico 2014: Leg 3, April 10-May 1, 2014. Check out the archived information including mission overviews, an education module, and more.
http://oceanexplorer.noaa.gov/okeanos/explorations/ex1402/welcome.html
http://oceanexplorer.noaa.gov/okeanos/explorations/explorations.html

Exploration through Navigation Challenge
In the Fall 2008 NASA Quest Challenge, students will first be tasked to chart a course from the Big Island of Hawai'i to Rapa Nui (Easter Island) using ocean navigation skills that were used in early Polynesian exploration. In Part II of the Challenge, students will be tasked to chart a course from Kennedy Space Center at Cape Canaveral, Florida to one of the lunar poles using navigation skills appropriate for outer space. See the website for an educator guide and much more.
http://quest.nasa.gov/challenges/lcross2/index.html

Explorations
University of California San Diego's Scripps Institution of Oceanography offers an online magazine, *Explorations*, to inform and educate about ongoing research and events. It features research highlights, multimedia, and more. *Voyager* is a separate section for kids, with science experiments, activities, and Ask Voyager, welcoming questions from readers about a wide range of topics.
http://explorations.ucsd.edu/

Explorations Into Water Teaching Curriculum
Rain Bird's Explorations Into Water Teaching Curriculum is an educational tool providing teachers and parents with lesson plans and related course work geared to students in grades 3-6. This downloadable elementary curriculum motivates students to think about the part each person plays and the actions they can take in using and conserving water, through hands-on outdoor activities and classroom demonstrations.
http://www.rainbird.com/iuow/community/curriculum.htm

Explorations@Scripps
The Scripps Institution of Oceanography offers a monthly e-newsletter with multimedia, archives of ocean and earth science information, feature articles, and more.
http://explorations.ucsd.edu/@Scripps/

Exploratorium: Microscope Imaging Station
The Microscope Imaging Station from the Exploratorium offers a door to the wonder of the microscopic world. Visitors can view images from sea urchins, zebrafish, and more. Each feature includes images of the cells, along with complete background material on the work that is being done through the use of these high-powered images. The Gallery

offers high-resolution images and movies created with research-grade microscopes. The website also includes classroom activities, printable flipbooks, and more.
http://www.exploratorium.edu/imaging_station/index.php

Exploratorium Webcast from the South Pole
The Exploratorium will host a series of webcasts from the South Pole where astrophysicists and engineers are installing a new 10-meter telescope. The webcasts begin November 25, 2006 and continue through the end of December. They also offer an e-newsletter to stay informed of Exploratorium webcasts and other events. The Digital Assets Archive offers digitized museum materials related to exhibits and scientific phenomena, including images, educational activities, QuickTime movies, and more.
http://exploratorium.edu/index.html

Explore! Ice Worlds
Developed by the Lunar and Planetary Institute and funded by NASA, *Explore! Ice Worlds* is a suite of activities designed for children ages 8-13 in celebration of the International Polar Year. All activities are tied to National Science Education Standards and use inexpensive, easy-to-find materials. Free webcast training in using these activities will be available in February and March 2009 for 4 hours.
Contact Katy Buckaloo at buckaloo@lpi.usra.edu to register for the training.
http://www.lpi.usra.edu/education/explore/ice/activities/

Explore the Blue
The Take Me Fishing Campaign and Discovery Education have partnered to offer Explore the Blue, a comprehensive program providing free resources to engage students in a dialogue about boating, fishing, and other outdoor recreational activities, as well as teach them the value of clean and healthy waterways. The website offers standards-aligned lesson plans for K-5 across all subject areas including math, science, language arts, social studies, and more; videos and multimedia tools; and much more.
http://exploretheblue.discoveryeducation.com/

Explore the Ocean
This website by the author of the Agnes Pflumm books offers links to a variety of ocean literacy resources students and teachers. Check out the links to science and art, the Science Rap, and much more.
http://www.agnespflumm.com/secret_seven_explore.htm

Explore the Role of Snow Cover in Shaping Climate
The Earth Exploration Toolbook offers Using NASA NEO and ImageJ to Explore the Role of Snow Cover in Shaping Climate. Students download satellite images displaying land surface temperature, snow cover, and reflected short wave radiation data and explore and animate these images. They use web-based analysis tools to observe, graph, and analyze the relationships among these three variables.
http://serc.carleton.edu/eet/albedo/index.html

Explore the Sea
The Marine Education Trust website offers the downloadable *Explore the Sea* for those working on education projects with young people. The booklet offers 35 ideas for practical, hands-on sessions, which include simple science experiments, games, art, role-play scenarios, and social history projects. The materials are available in English, French, and Malagasy. Free registration may be required.

http://www.marineeducationtrust.org/downloads

Explore STEM Careers
Change the Equation, in partnership with E-Line Media, has created iON Future, a suite of free online learning games that encourage middle school to early high school-age youth to explore careers in science, technology, engineering, and math. Check out the learning guide.
http://changetheequation.org/
http://changetheequation.org/sites/default/files/Learning%20Guide%20Beta%20Version%2011-5-12.pdf

Explore Underwater Victoria
Australia's Explore Underwater Victoria website is an initiative of the Victorian National Parks Association with support from Reef Watch and Museum Victoria. The website is designed to be an online porthole of Victorian underwater photographs, videos, resource links, and more. The goal is to raise awareness, understanding, and appreciation of Victoria's natural marine environment. Check out the downloadable teaching guides, education kits, and other resources on this website.
http://www.exploreunderwatervictoria.org.au/teaching-guides/

Explore the World with Shorebirds
Explore the World with Shorebirds educators' guide is the curriculum for the Shorebird Sister Schools Program, an internet-based conservation education program designed for educators and their students. The content of *Explore the World with Shorebirds* includes chapters on connecting cultures, a shorebird primer, classroom activities, and field trip planning. Activities found within the guide are correlated with the National Education Standards in the United States. The *Explore the World with Shorebirds* CD-ROM is free.
http://sssp.fws.gov

Explorers Education Programme
The Marine Institute website offers an Explorers Education Programme, with lesson plans, resources, and activities for primary school teachers to inspire their student's interest and knowledge in the ocean, marine environment, species, and seashores. The lesson plans and activities aim to integrate marine themes into strands taught in primary schools, including science, history, visual arts, and more. Be sure to check this out.
http://www.marine.ie/Home/site-area/areas-activity/education-outreach/explorers-education-programme

Exploring Atlantic Canyons and Seamounts 2014
From August 9-August 30, 2014, NOAA Ship Okeanos Explorer conducted a mapping expedition in the North Atlantic in Veatch Canyon and along the New England Seamount chain. From September 4-October 7, 2014, scientists aboard the NOAA Ship Okeanos Explorer will explore the diversity of benthic habitats and features in this region. Read about the August mission and check back for upcoming details about the upcoming expedition.
http://oceanexplorer.noaa.gov/okeanos/explorations/explorations.html

Exploring Atlantic Canyons and Seamounts 2014
From September 4 to October 7, 2014, NOAA Ship Okeanos Explorer explores the largely unknown deep-sea ecosystems of the U.S. Atlantic coast. The at-sea and shore-based science team will collect baseline data in the Atlantic submarine canyons and

along the New England Seamount Chain. Watch live feeds from the remotely operated vehicle Deep Discoverer throughout the New England Seamount and Atlantic Canyon regions.
http://oceanexplorer.noaa.gov/okeanos/explorations/ex1404/welcome.html

Exploring Biodiversity: A Guide for Educators around the World
Conservation International provides *Exploring Biodiversity: A Guide for Educators around the World,* developed to introduce basic concepts of biodiversity conservation, support educator training, and inspire and guide the development of local biodiversity education materials. Adapted from the World Wildlife Fund curriculum Biodiversity Basics, this guide offers background information on biodiversity conservation as well as hands-on activities for teachers and non-formal educators to implement with students.
http://www.conservation.org/xp/CIWEB/programs/awareness/education/

Exploring Climate Change Impacts Curriculum Guide
The Union of Concerned Scientists has produced a *Global Warming: Early Warning Signs* map and teaching materials geared towards students and teachers in grades 9-12, exploring the local and regional consequences of global climate change.. Individual exercises are adaptable to different grade levels and engage students in an exploration of the impacts of global climate change on ecosystems and natural resources.
http://www.climatehotmap.org/ .

Exploring Data
The Exploring Data website makes understanding statistics a bit easier for students, teachers, and researchers needing a review. The site is easy to navigate, with an index of topics and materials on the home page ranging from linear regression to sampling. Each of these sections includes activities, worksheets, and datasets that can be used in a variety of ways. The site includes both introductory and advanced materials.
http://exploringdata.cqu.edu.au/

Exploring Earth Website
The investigations and visualizations on this site are designed to accompany the high school textbook *Earth Science*. Visualizations and investigations on the site are designed to build students' knowledge of Earth Science concepts described in the textbook, and to raise student awareness of Earth as a system of interconnected components and processes. The website includes Investigations, Visualizations, Data Centers, and more. Topics range from geodesy through waves and currents, and more.
http://www.classzone.com/books/earth_science/terc/navigation/home.cfm

Exploring Energy Resources for Educators and Students
The goal of Earth Science Week, conducted annually by the American Geological Institute in partnership with other sponsors, is to encourage students, educators and the public to explore the natural world and learn about geosciences. This year's theme is *Exploring Energy*, and NASA offers a variety of multimedia products and educational activities designed to improve understanding of energy resources and the role of energy in Earth's climate system.
http://climate.nasa.gov/esw2010/

Exploring the Environment
The Exploring the Environment online series, featuring an integrated approach to environmental earth science through modules and activities promotes science-literate

and reflective students who are knowledgeable of the earth's processes and their responsibilities for stewardship. The series provides students with tools to investigate scientific, social, political, and cultural aspects of controversial, authentic environmental problems. Standard problem-solving models, online resources that include relevant satellite imagery, and recommendations for extended inquiry are available. Modules include Severe Weather: Hurricanes!, Coral Reefs, Florida Everglades, Earth on Fire, and much more. The teacher pages include teacher support, module notes, information about planning and assessment, software, and links to additional websites.
http://www.cotf.edu/ete/

Exploring Environmental History Podcast
Environmental History Resources explores how environmental changes have caused historical trends. Each podcast episode has a written synopsis, literature cited, and more. Be sure to check out the wide range of topics reflecting the interdisciplinary nature of environmental history, including landscape history, forestry and land use, pollution, and ideas and perceptions of nature.
http://www.eh-resources.org/podcast/podcast.html

Exploring Environmental Issues: Biodiversity
Exploring Environmental Issues: Biodiversity was developed by Project Learning Tree in partnership with the World Wildlife Fund. This module uses biodiversity as a window through which secondary students investigate the environment. It permits educators and students to step back from specific issues and species and instead, examine broader concepts and larger connections - not just biological, but political, cultural, ethical, and economic as well.
http://plt.org/cms/pages/21_21_16.html

Exploring the Hidden World of the Maritime Maya 2011 Expedition
NOAA's Office of Ocean Exploration and Research hosts the webpage, *Exploring the Hidden World of the Maritime Maya 2011 Expedition*. The posting includes daily logs, videos and images, an Ocean Explorer Expedition Education Module, lesson plans, and more. The expedition runs September 13-30, 2011.
http://oceanexplorer.noaa.gov/explorations/11maya/welcome.html

Exploring the Inner Space of the Celebes Sea
NOAA's Ocean Explorer traveled to the Inner Space of the Celebes Sea, unexplored waters south of the Philippine Islands, September 27-October 16, 2007. Lying just north of the equator, the Celebes Sea is the center of the most biologically diverse area of the world's ocean. Internet coverage includes Speciation, Midwater Technology, Bluewater Diving, Marine Conservation, and Sea Surface Temperature content essays written especially for this mission.
http://oceanexplorer.noaa.gov/explorations/07philippines/welcome.html

Exploring Mote Marine Laboratory Oceanography Data in the Classroom
This guide instructs educators on the classroom use of transect station data from the Mote Marine Laboratory Phytoplankton Ecology Program, consisting of hydrographic conditions and chlorophyll fluorescence. Topics include harmful algal bloom dynamics and prediction methods; temperature-depth relationships; relationships between temperature, salinity, and density; and the use of Conductivity-Temperature-Depth (CTD) instrument casts.
http://serc.carleton.edu/usingdata/datasheets/MoteMarineLab.html

Exploring the Northwestern Hawaiian Islands
Explore the Northwestern Hawaiian Islands through the eyes of graduate students as they study marine conservation in the remote, restricted Papahānaumokuākea Marine National Monument of the Northwestern Hawaiian Islands and spend three days learning about environmental issues on Oahu. The students offer blogs, photos, and videos from their trip, which took place January 13-25, 2008.
http://www.nicholas.duke.edu/hawaii

Exploring Ocean Color Data in the Classroom
This guide introduces educators to the use of ocean color data in the classroom. The data, from NASA's Ocean Biology Processing Group, are used to examine biological activity and physical and biological interactions in the oceans. Topics include estuarine dynamics; ocean current systems; upwelling; El Nino and La Nina variability; and climate change.
http://serc.carleton.edu/usingdata/datasheets/LOCUS.html

Exploring the Ocean Surface with Data from the Global Drifter Program
This guide from the Science Education Resource Center at Carleton College provides educators with information on the classroom use of buoy data from the Global Drifter Program. The data are used to track ocean currents and measure properties such as sea surface temperature, salinity, wind speed, and atmospheric pressure. Topics include meteorology, ocean surface currents, and hurricanes.
http://serc.carleton.edu/usingdata/datasheets/GlobalDrifterProgram.html

Exploring Oceanography Using Data from MBARI
This guide introduces educators to the classroom use of oceanographic data from the Monterey Bay Aquarium Research Institute with near real-time, quality controlled data on surface and subsurface temperature and salinity; CO2 and O2 concentrations; and relative fluorescence. Teaching topics include topography; plate tectonics of the ecology of the Monterey Bay region; and more.
http://serc.carleton.edu/usingdata/datasheets/MBARI.html

Exploring Paleoclimatology in the Classroom
This guide provides instructions for educators on how to access and use coral radioisotope data for classroom activities. The data from the World Data Center for Paleoclimatology cover a 271 year period. Educational topics include methods for reconstructing temperature records; the South Pacific Gyre and EL Nino/Southern Oscillation (ENSO); and the relevance of decadal variations in sea surface temperature.
http://serc.carleton.edu/usingdata/datasheets/Paleoclimatology_Rarotonga.html

Exploring the Submerged New World Expedition
NOAA's Ocean Exploration and Research Program has launched the Exploring the Submerged New World Expedition on its Ocean Explorer website. The expedition posting includes daily logs, videos and images, an Ocean Explorer Expedition Education Module, lesson plans, Ask an Explorer, and more.
http://oceanexplorer.noaa.gov/explorations/09newworld/welcome.html

EXPLO.TV
This website is the video component of the Exploratorium: Museum of Science, Art and Human Perception in San Francisco. This site offers webcasts, podcasts, and video

clips, with many in the Ice Stories series - dispatches from polar scientists. You can browse by subject, category, and much more.
http://www.exploratorium.edu/webcasts/index.php

Extended Continental Shelf Project
ContinentalShelf.gov is a new web portal designed by NOAA in support of the 2009 Extended Continental Shelf Project, a multi-year, multi-agency effort. The website offers background on the mapping project, frequently asked questions, a glossary of terms, and more.
http://continentalshelf.gov/

Extreme 2003: To the Depths of Discovery
This website from Delaware Sea Grant highlights an expedition from November 29 - December 21, 2003. Expanded curricula have been developed for both middle and high school, and a new evaluation is in place.
http://www.ocean.udel.edu/extreme2003

Extreme 2004: Expedition to the Deep Frontier
University of Delaware marine scientists will lead *Extreme 2004: Expedition to the Deep Frontier*, from November 30-December 20, 2004, a National Science Foundation expedition to hydrothermal vents in the Pacific Ocean. Middle- and high-school classrooms are invited to join via a virtual field trip. The University of Delaware will offer participating teachers free classroom materials about the deep sea, including student resource guides, curricula, a video, and more.
http://www.ocean.udel.edu/expeditions .

Extreme Eukaryotes
This article from the Natural History Museum in London is an early summary of information about free-living eukaryotes in extreme environments. The article includes list of peer-reviewed references up to 1997.
http://www.nhm.ac.uk/research-curation/research/projects/euk-extreme/

Extreme Event: Coastal City
The Extreme Event game for 12- to 48-players was made to help groups from communities to classrooms see how they'd fare in a disaster scenario. The quick-paced game is played on tablets or laptops and features an unfolding disaster in four phases—preparation, response, recovery, and adaptation.
https://www.koshland-science-museum.org/extreme-event/

Extreme Virtual Expeditions
Explore foreign and domestic seas or the deep ocean with a virtual expedition linked from the Bridge. In the past few weeks, we have seen teachers working with researchers in and around the Aquarius underwater habitat and an extreme deep sea adventure to the hydrothermal vents on the floor of the Pacific Ocean. Most of these virtual expeditions have daily blogs from the scientists, researcher profiles, video and pictures, lesson plans, and more.
http://www2.vims.edu/bridge/search/bridge1output_menu.cfm?q=expedition
http://www.marine-ed.org/bridge

Extreme Weather 101 - Online
The National Environmental Education Foundation offers the free online course, Extreme Weather 101, devoted to helping the American public understand and prepare for the impacts of extreme weather and climate change. Students learn the basics about extreme weather and climate change through videos, quizzes, and toolkits, with tips and links to preparedness resources.
https://www.udemy.com/extreme-weather-101/#/

Extreme Weather Map 2012
This interactive map from the Natural Resources Defense Council allows visitors to view an easy-to-understand graphic showing the record-breaking drought, high temperatures, and large-scale fires by month, either for the entire country or by individual state.
http://www.nrdc.org/health/extremeweather/

Extremophilic Bacteria and Microbial Diversity
This online enhancement chapter of a textbook for undergraduate majors examines the many prokaryotic organisms that inhabit extreme. Topics include using new molecular techniques to discover more about bacteria; life at high temperatures, low temperatures, extreme pH levels and in a brine; and extremophiles in the evolution of life.
http://www.mhhe.com/biosci/genbio/raven6b/graphics/raven06b/enhancementchapters/raven30_enhancement.html

Eyes on the Bay
This website includes real-time and archived data measuring parameters in the Maryland portion of Chesapeake Bay, including air and water temperature, salinity, dissolved oxygen, pH, and water clarity. The website offers lesson plans along with links to additional water quality resources.
http://mddnr.chesapeakebay.net/eyesonthebay/index.cfm

The Eyes of Nye
This new series from Bill Nye (the science guy), *The Eyes of Nye*, is geared toward older children and adult viewers. It provides a more in in-depth look at science topics that are making news, changing lives, and impacting policy. Episodes began airing on public TV in April, and include population and climate change. The website offers links to additional content, information about scientists featured in the episodes, and more
www.eyesofnye.org

Faces of Climate Change
The Alaska Marine Conservation Council, COSEE Alaska, in partnership with Alaska Sea Grant program, has produced three short videos showcasing the dramatic changes in Alaska's marine ecosystems. These introductions to the impacts of climate change in Alaska include interviews with Alaska Natives, commentary by scientists, and footage from Alaska's Arctic.
http://www.aoos.org/

Faces of the EPA
Introduce your class to EPA's staff through the Faces of the EPA video series. The videos spotlight employees ranging from special agents, to ocean explorers, and others as they explain their career paths and passion for their work.
https://www.youtube.com/playlist?list=PLBhfkkujnoRD-7H1lYa5FQ10AFgsjbnlh

Facing the Future Activities
Facing the Future's new lesson book for middle and high school teachers, *Engaging Students through Global Issues: Activity-Based Lessons and Action Projects*, is a companion to Facing the Future's student texts. Designed to help students understand complex global issues and sustainable solutions, the lessons cover a range of topics including biodiversity and global health. Many of the lessons are available to download from the website, including water-related lessons, Fishing for the Future, games, and more.
www.teacherscorner.org/activities

Factbook of Economic, Environmental, and Social Indicators
The online version of the Organization for Economic Co-operation and Development (OECD) Factbook 2005 of economic, environmental and social indicators for the world's core economies is available. The chapters include environment, science and technology, and education.
http://new.SourceOECD.org/factbook

The Failure of Environmental Education (and How We Can Fix It)
In this article, authors Daniel T. Blumstein and Charlie Saylan argue that it is time for the environmental education community to take stock of itself. They suggest ways that an "evidence-based" approach can improve environmental education and that to create environmentally aware citizens, some difficult lessons must be taught.
http://biology.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pbio.0050120

False Assumptions
This false assumption activity from the Evolution & the Nature of Science Institutes at Indiana University teaches high school students about the nature of science, its uncertainty, and the need to consider multiple perspectives and ask different questions. Students solve short problem scenarios by only asking yes/no questions. Recognizing the false assumption makes the solutions tricky.
http://www.indiana.edu/~ensiweb/lessons/falsasum.html

Farming the Waters for People and Food
The Proceedings of the Global Conference on Aquaculture 2010 reviews the present status and trends in aquaculture development, addresses emerging issues relevant to aquaculture development, assesses opportunities and challenges for future aquaculture development, and more.
http://www.fao.org/docrep/015/i2734e/i2734e00.htm

Faultline
Faultline provides the history and science of earthquakes. Sections include quake basics, damage control, and more. Active Zone includes multimedia, activities, and more, while Live Eye on the Earth links to real-time data.
http://www.exploratorium.edu/faultline/

Farming the Seas
Habitat Media, the California-based non-profit media production house, creators of *Empty Oceans, Empty Nets*, is offering *Farming the Seas* to marine and environmental educators, zoos and aquariums for screening at upcoming events during the summer and fall of 2004. *Farming the Seas* explores what's at stake as the aquaculture industry

spreads across the globe. The film highlights ground-breaking efforts by scientists, communities and industry to develop viable, sustainable operations.
www.habitatmedia.org .
rivkahbeth@habitatmedia.org .

Federal Career Intern Program and Student Educational Employment Program
The *Federal Career Intern Program* is designed to help agencies recruit and attract exceptional individuals into a variety of occupations. In general, individuals are appointed to a 2-year internship. Upon successful completion of the internships, the interns may be eligible for permanent placement within an agency. The *Student Educational Employment Program* provides Federal employment opportunities to students who are enrolled or accepted for enrollment as degree seeking students taking at least a half-time academic, technical, or vocational course load in an accredited high school, technical, vocational, 2 or 4 year college or university, graduate or professional school.
http://www.opm.gov/careerintern/
http://www.opm.gov/employ/students/intro.asp

Federal Education Digital Resources Library
The Federal Education Digital Resources Library (FEDRL) features a collection of free science and mathematics education resources. The site provides descriptions of a range of online materials that were developed with U.S. Department of Education or National Science Foundation funding. These materials include lesson plans, magazine articles, student resources, and materials for teachers' professional development.
http://encdl.org/search/simple/0,5046,,00.shtm .

Federal Evaluators
Federal Evaluators is an informal association of evaluation officials in the legislative and executive branches of the U.S. government. The website was established to provide access to information about federal evaluation activities as well as access to resources useful for conducting evaluations, including downloadable publications, useful evaluation websites, and more.
http://www.fedeval.net/

Federal Resources for Educational Excellence
Federal Resources for Educational Excellence (FREE) has been redesigned with improved navigation. The site links to over 1500 teaching and learning resources available from the federal government. The Earth Sciences section offers quick links to resources on oceanography, climate change, and the environment, while Life Sciences offers zoology, botany, and more.
http://free.ed.gov

FedFlix
As part of a joint venture between the National Technical Information Service and Public.Resource.Org, the Internet Archive has created this archive of government training films from the past six decades. Users can browse the collection by title or subject, or by word search. The films come from a wide variety of government agencies, including the U.S. Army, NASA, and more. (A simple search on "ocean," and "moving images" produced an interesting array of items).
http://www.archive.org/details/FedFlix

Federal Science Website
A federal website makes scientific information gathered by different agencies accessible to the public. The site is an offshoot of Firstgov.gov, housing information under one roof from the multiple agencies that perform scientific research.
www.science.gov

Feet Wet, Hands Dirty
The book *Feet Wet, Hands Dirty: Environmental Projects in Maryland Public Schools,* highlights 15 different elementary school student-developed environmental projects. Maryland's EE program provides students with the opportunity to investigate environmental issues and take action to preserve or restore the environment. The website offers a preview of the first 15 pages of the book.
http://www.blurb.com/bookstore/detail/111841

FEMA for Kids Website
For younger kids, check out this website for games, challenges, quizzes, and information on dealing with disasters. It also has resources for parents and teachers.
www.fema.gov/kids

FerryMon
The FerryMon (ferry monitoring) project installed oceanographic instruments on ferries traversing Pamlico Sound in North Carolina. Ship-board instruments allow ferries to take water samples every three minutes, monitoring changes in environmental conditions as they happen and providing the continuous environmental information about the surface waters of the sound. Information is sent from ferries to a laboratory via cell phone line, and then converted to graphs for a wide range of users, including educators.
http://www.unc.edu/ims/paerllab/research/ferrymon/index.html

FGBNMS Mapping Tool
Flower Garden Banks National Marine Sanctuary (FGBNMS) offers an online GIS-based mapping tool of the sanctuary through a Google-based map. The interactive page includes information about a number of reefs and banks of the northwestern Gulf of Mexico. One notable feature is the incorporation of ROV (Remotely Operated Vehicle) tracks with associated photos. While only one dive track has been uploaded to date, others will be added in the future.
http://flowergarden.noaa.gov/news_events/gismaparticle.html

Field Guide to Aquatic Invasive Species
The Pennsylvania Aquatic Invasive Species Field Guide can help users identify new invasive species infestations and slow or stop their spread in Pennsylvania's waterways. The downloadable field guide includes how to properly collect and report specimens, species profiles, and more.
http://www.paseagrant.org/projects/pennsylvanias-field-guide-to-aquatic-invasive-species/

Field Guide to the Future
Field Guide to the Future is a practical, step-by-step manual describing methods that can help communities think ahead and prepare for changes in their environment and natural resources. The authors have collaborated with communities in the management of forests, land, and water in many parts of the world, but particularly in tropical forest margins. In this manual they share their experiences and lessons learned about

methods that can help communities prepare for the future. Spanish and French translations will be available late 2006 or 2007.
Contact Sandra Velarde at s.velarde@cgiar.org

Field Guide to the Monterey Bay National Marine Sanctuary
The Monterey Bay National Marine Sanctuary offers the downloadable *Field Guide to the Monterey Bay National Marine Sanctuary*. The guide was designed for use by both visitors to and residents of communities adjacent to the marine sanctuary as a travel guide or for educational purposes. The guide includes information on each sanctuary habitat, as well as descriptions and photographs of the some of the sanctuary's most commonly seen marine wildlife and the best times of the year to view them.
http://montereybay.noaa.gov/reports/2006/fieldguide/welcome.html

Field Guide to the Nonindigenous Marine Fishes of Florida
A new field guide is being distributed in South Florida, designed to stem the tide of invasive marine fishes by aiding in the detection of nonindigenous species. The *Field Guide to the Nonindigenous Marine Fishes of Florida* includes biological and ecological profiles and sightings information for 38 species of fish previously identified in South Florida estuarine and marine waters. The website allows users to download the full document, read about specific species, and more.
http://fl.biology.usgs.gov/Marine_Fish_ID/index.html

Field Guide to Tidal Wetland Plants
The University of Massachusetts Press offers "Field Guide to Tidal Wetland Plants of the Northeastern US and Neighboring Canada". The book emphasizes plant identification and provides simple, easy-to-use keys and descriptions for identifying over 700 species found in the region's salt and brackish marshes, tidal freshwater marshes and swamps, tidal flats, rocky shores (including dominant algae), beaches, and coastal ponds.
http://www.umass.edu/umpress/spr_08/tiner.htm

Field Museum: Insects, Arachnids and Myriapods Collections
The Field Museum in Chicago has over 4.1 million preserved insects in its collection along with 8.3 million specimens preserved in alcohol or on microscopic slides. On this website, visitors can search these vast holdings, which are divided into six separate areas: all arthropods, ants, arachnids & myriapoda, bulk arthropod samples, coleoptera, lepidoptera, and vertebrate ectoparasites. The museum also hosts collections of fishes and more – check out the full website.
http://fieldmuseum.org/explore/department/zoology/insects/collections

Field Trip Earth
Field Trip Earth is an online resource for teachers, students, and proponents of wildlife conservation that focuses on field-based wildlife conservation research projects around the world. Students and visitors can read researchers' field diary entries, direct questions to the researchers, and more. Check out Sea Turtles in North Carolina, Climate Change in Manitoba, and more. Be sure to look through the educator resources, discussion groups, and other materials on this website.
http://www.fieldtripearth.org/

Field Trip Earth
Field Trip Earth focuses on field-based wildlife conservation research projects ongoing around the world. All of the projects provide classrooms and others around the world the

opportunity to interact meaningfully with wildlife researchers and other conservation experts. Students can read researchers' field diary entries, direct questions to the researchers, watch video taken in the field, and more. Information is available for sea turtles, waterfowl, and more.
http://www.fieldtripearth.org/

Field Trip Finder
Visit this website to help find educational field trips. It's easy to use and offers links to the websites of the field trip locations matching your selected criteria.
http://fieldtripfinder.com/

Field of View: Palmer LTER
Follow along on the 21st field season with the Palmer Long Term Ecological Research program and Teacher at Sea correspondent Johanna Blasi from the New England Aquarium. Track the ship and weather along the peninsula, explore the environment, and more through graphics, photos, and videos. Educators can download instructional materials that parallel the scientific research and encourage their students to post questions directly to the scientists.
http://pal.lternet.edu/blogs/2012/

Fifty Facts about Wider Caribbean Coral Reefs
Compiled for the International Year of the Reef, *Fifty facts about Wider Caribbean Coral Reefs* offers interesting facts about coral reefs and human impacts in the wider Caribbean. There are also links to additional resources, news, events, and more.
http://www.iyor.org/focalpoints/orgs/unep-car/Caribbean_Coral_Reefs.asp

Financing Protected Area Publications
The World Conservation Union (IUCN) World Commission on Protected Areas website offers several publications on the financing of protected areas. Downloadable documents include *Sustainable Financing of Protected Areas: A global review of challenges and options; Financing Protected Areas - Guidelines for Protected Area Managers;* and *Guidelines for Tourism in Parks and Protected Areas of East Asia.*
http://www.iucn.org/themes/wcpa/pubs/subject/financing.html

Find Events on Nature Rocks
The Nature Rocks website offers the ability to find activities and nature near you; users can also add events to the website.
http://www.naturerocks.org/find-activities.aspx

Find-a-Photo Website
USDA Forest Service's Find-a-Photo website offers the NatureWatch, Wildlife, Fish, and Threatened and Endangered Species Program's Photograph Library. Find-a-Photo allows you to access thousands of copyright free wildlife, fish, wildflower, and environmental education photographs. Check back often since new photographs are being added quite frequently. These copyright-free photographs are available for non-profit use; please credit the photographer.
http://wwwnotes.fs.fed.us:81/wo/wfrp/find_a_photo.nsf/

Finding Coral Expedition
A team of scientists took part in a two-week-long expedition funded by the Living Oceans Society, June 9-23, 2009, designed to study deep sea corals in the North Pacific off the

west coast of Canada and document threats to their well being. The interactive website includes background information, expedition logs, video, maps, and much more.
http://findingcoral.com/

Finding Fish Hotspots and Mapping Coral Reefs
From March 28-April 7, NOAA scientists will be on a research expedition in the U.S. Virgin Islands aboard the NOAA Ship *Nancy Foster*. The science team will use multibeam sonar, scientific echosounder, underwater gliders, a remotely operated vehicle, and other high-tech tools to locate previously-unknown seafloor habitats; to map out coral reefs in fine detail; and to find hotspots where many species of fish gather to spawn in rhythm with the lunar cycle.
http://oceanservice.noaa.gov/caribbean-mapping/

Fire Adapted Communities Learning Network
The FAC Learning Network, managed by the Watershed Research and Training Center and The Nature Conservancy, encourages the development and sharing of best practices and innovations in order to accelerate the adoption of fire adapted community concepts nationwide. The network and website supports hub organizations and pilot communities that have committed to implementing, assessing, and sharing the work that they are doing to increase their communities' resilience to wildfire.
http://facnetwork.org/

Fire Ecology and Management
This six-module series from the Northwest Center for Sustainable Resources addresses both the general role of fire in ecosystems as well as specific wildfire management issues in forest ecosystems. Each module can be downloaded or ordered in hardcopy.
http://www.ncsr.org/materials/NCSRFireEcologySeries.htm

Fire Education Resources
The National Wildfire Coordinating Group Wildland Fire Education Working Team has recently completed a reference document to fire education products which are available on the web or through the symbols cache.
http://www.myfirecommunity.net/NeighborhoodPosts.aspx?ID=468&Topic=1820&Category=1

Fire eFieldTrip
The Bureau of Land Management has sponsored an eFieldTrip on Fire's Role in Ecosystems: A Hot Topic! The trip takes place from the National Interagency Fire Center in Boise, Idaho. The program has four major components: a virtual visit, a trip journal worksheet, ask the experts, and a live webchat. Archives of the questions and answers are posted on the website.
www.eFieldTrips.org

Fire Information and Education
The Wildland Fire Lessons Learned Center on-line Advances in Fire Practice has posted a Special Issue, *Fire Information and Education: A New Message for New Challenges*. Articles illustrate the value of innovative approaches to communicating with the public: using different communication styles, using windows of opportunity, and providing information in terms people can understand; and much more about fire education and outreach.
http://www.wildfirelessons.net/AFP.aspx?Page=AFPOverview

Fire Management - Learning From the Experts
Fire Management - Learning From the Experts captures the experience of seasoned employees who are acknowledged by their peers to have high expertise in planning and implementing fire programs. Topics include fire behavior prediction, high reliability organizing, stories, and more.
http://www.wildfirelessons.net/Additional.aspx?Page=124

Fire & Smoke
A new NASA Fire and Smoke website shows latest fire views and research. Satellites, aircraft, and research know-how have created numerous cutting-edge tools to help firefighters battle wildfires and scientists understand the impact of fires and smoke on Earth's climate and ecosystems. This website brings the latest information to the public. The site is includes images of fires and their associated smoke plumes in the United States and around the world as well as articles and multimedia resources.
http://www.nasa.gov/mission_pages/fires/main/index.html

FIRESafe Marin
Firesafe Marin is a non-profit organization dedicated to reducing wildland fire hazard and improving fire safety awareness in Marin County. They foster community involvement by building partnerships and providing resources for mitigating fire danger. The website includes a survival guide, firewise plant list, a teacher's guide, and additional information.
http://www.firesafemarin.org/index.html

Firestorm!
The Environmental Literacy Council offers teaching materials to help high-school and middle-school educators teach about forest fire management. The modules, *Firestorm: Thinking Critically about Environmental Issues*, use a fictionalized controversy about the role of prescribed burning in forest management to teach the process of making important decisions about the environment through a role-play exercise. Acting as community stakeholders, students learn to gather and analyze information.
http://www.enviroliteracy.org/article.php/1279.html

First Bloom
First Bloom is a National Park Foundation program that connects kids in grades 4-6 to nature and national parks. First Bloomers meet with park rangers monthly over one program year. They engage in outdoor, hands-on activities and build their relationship with the outdoors and their national parks. First Bloom activities can also be used in a classroom setting. The website provides games and activities on biology, ecosystems, and stewardship.
http://s291372515.onlinehome.us/index.php

First Census of Marine Life 2010
The 64-page report, *First Census of Marine Life 2010: Highlights of a Decade of Discovery* describes some of the scientific highlights of ten years of exploration, research, and analysis undertaken by Census of Marine Life scientists. The report is available to download in thirteen languages. The website also offers a myriad of additional resources and links.
http://www.coml.org/

FIRST LEGO League Challenge
The FIRST LEGO League is a robotics program for 9-14 year olds designed to get children excited about science and technology and teach them employment and life skills. Each yearly challenge has three parts: the Robot Game, the Project, and the FLL Core Values. The 2014 Challenge Project mission is to find a better or more innovative way to help someone learn.
http://www.firstlegoleague.org/

The First Sue Nami
The USGS SAFRR team (Science Application for Risk Reduction) worked with the Pasadena Art Center College of Design to develop a short movie to communicate tsunami safety information to an 18-34 year old audience. Sue Nami, the force of nature herself, travels through different beach environments to warn people about the dangers of a tsunami and how to be prepared if one were to strike.
http://www.usgs.gov/natural_hazards/safrr/projects/suenami.asp

Fiscal Management Manual for NGOs
Island Resources Foundation offers the 44-page Fiscal Management Manual for NGOs as a free download. The manual is a practical guides to special fiscal management requirements for accounting for NGOs and other not-for-profit or non-commercial civil society organizations.
http://www.irf.org/mission/development/pubs.php

Fish Behavior
Nature, the International Weekly Journal of Science, offers the online news article, Animal behaviour: inside the cunning, caring, and greedy minds of fish. The article discusses behaviors that show how fish cooperate, cheat, and punish.
http://www.nature.com/news/animal-behaviour-inside-the-cunning-caring-and-greedy-minds-of-fish-1.17614?WT.ec_id=NATURE-20150528

A Fish is a Fish
A Fish is a Fish, produced by Project FISH in partnership with Windsor Nature Discovery, is an activity for all ages that are learning to identify fish. The activity helps participants learn about the general characteristics of fish; acquire, analyze, and apply information; develop and use dichotomous keys; identify fish families; and apply this knowledge toward better fishing skills.
Contact Project FISH at steph143@msu.edu

Fish Forever Videos
The Fish Forever video series includes ten 3-minute videos for students and the same 10 topics as 5-minute videos for fishermen. Titles include Tagging Jacks, From the Bottom Up, and more. Many are available on the Western Pacific Fishery Council YouTube website
http://www.youtube.com/user/wpcouncil/videos?sort=dd&shelf_index=0&view=0

Fish Identification Tools for Biodiversity and Fisheries Assessments
The FAO report, *Fish identification tools for biodiversity and fisheries assessments: review and guidance for decision-makers*, provides an appraisal of existing identification tools and shows their potential for providing the right solution in different real-life situations. The ID tools reviewed include use of scientific and local experts, image recognition systems, field guides based on dichotomous keys, and much more.

http://www.fao.org/docrep/019/i3354e/i3354e.pdf

Fish of the Great Lakes
The University of Wisconsin Sea Grant Institute has developed this website for the Fish of the Great Lakes. The website includes a downloadable version of George C. Becker's text *Fishes of Wisconsin*, profiles of the major fish species in the Great Lakes, information about fish anatomy, and even tips for safe cooking and eating. The Kids' Page includes a fish quiz, glossary, and more.
http://www.seagrant.wisc.edu/greatlakesfish/

Fish and Habitat Photos
NOAA's National Center for Coastal Monitoring and Assessment hosts on-line photos of reef fish, reef habitat, and aerial images from Hawai'i and the U.S. Virgin Islands. The fish photo website offers the ability to select by location, date, and type of fish.
http://www8.nos.noaa.gov/biogeo_public/

Fish Kids
EPA's National Fish Advisory Program has released this new Fish Kids website, using interactive stories and games to teach students ages 8-12 about contaminants in fish and fish advisories. Whether they catch their own fish or buy it at a store, kids and their families can use this site to learn how to choose fish wisely.
http://www.epa.gov/fishadvisories/kids/

Fish Olympics
This interactive website allows kids to learn about different species of fish and their areas of expertise. It's up to the students to guess who the winners will be in each of 4 categories, based on what they learn as they go.
http://www.liverpoolmuseums.org.uk/nof/fish/index.html

Fish and People
Fish and People is a five module video education series with accompanying lesson plans and teaching resources (on the DVD) intended for use in the Solomon Islands, but with broader applicability. It uses animation to visualize invisible life cycle and fishery management concepts. Check out the modules from this Vimeo website.
http://vimeo.com/channels/fishandpeople/56892703

Fish Population and Harvest Management Exercise
In this exercise, the students will be in charge of their own fishing fleet. The goal of the game is to educate students on how fragile a population of fish can be if harvested with little thought for long term use.
http://www.fws.gov/R5Crc/Salmon/workbook/fish_population_1.pdf

Fish Recycling
Check out this good idea: A newly launched fish recycling program, sponsored in part by the Mississippi-Alabama Sea Grant Consortium, is repurposing fish parts that are left behind after charter boat crews clean their customers' catch.
http://d276864.h39.zee-hosting.com/page.asp?id=783

Fish Research of Interest to Students
Use the article at this website when you want to show your students you can be on the same "wav"-length as they are. Scientists studying underwater fish acoustics have

identified another possible mechanism herring use to communicate.
http://www.newscientist.com/news/news.jsp?id=ns99994343

Fish Species Identification and Data Programme
The UN's Food And Agriculture Organization (FAO) website for [fish] Species Identification and Data Programme is set up to improve the identification of marine organisms of actual and potential interest to fisheries, provide tools, and improve fisheries data quality. The website has species identification publications, regional guides, fact sheets, species distribution maps, and more. Many of the publications are downloadable.
http://www.fao.org/fi/SIDP>http://www.fao.org/fi/SIDP .

Fish Tagging
Grays Reefs National Marine Sanctuary has been conducting Acoustic Fish Tagging projects off the coast of Georgia to learn more about the resident fish populations. Related classroom activities are available on the website along with information about the research.
http://graysreef.noaa.gov/science/research/fish_tagging/education.html

Fish2Fork
This website rates restaurants that serve fish, not only for the quality of their food but also for the effect they are having on the seas and on marine life.
http://fish2fork.com/apps/welcome

Fishackathons
Fishackathons will partner fishery experts with technologists to create innovative technology which address sustainable fishery challenges. During the initiative, June 16-17, 2014, fishery experts will define the challenges to guide technologists in creating concrete solutions that will make real and sustainable impacts. Check the website for locations.
http://www.fishackathon.co/

FishAlerts!
Great Outdoors Mobile offers this app for iPhone and Android users which informs recreational anglers about the locations and regulations of MPAs throughout the United States.
http://fishalerts.com/

FishBase
FishBase, developed by the WorldFish Center in collaboration with the UN Food and Agriculture Organization (FAO), is a global source for research on living aquatic resources. The site contains information on 28,400 fish species, as well as 35,900 pictures and 32,800 references. Check out the quiz section.
http://www.fishbase.org/home.htm .

Fisheries and Aquatic Resources
The National Biological Information Infrastructure Fisheries and Aquatic Resources website provides information about managed fish populations throughout the U.S., as well as watershed-based data and state-by-state fishing resources. Learn about freshwater and marine fishes, aquatic invertebrates, water quality and habitats, and dams and fish passage. Make sure to check the teacher resources.

http://far.nbii.gov/

Fisheries Forum Information Network
The Fisheries Forum Information Network is an interactive online community whose purpose is to build connections within the federal fisheries management community. The network is designed to help fishery management professionals stay informed about the latest developments and innovations in U.S. fisheries policy.
http://www.fisheriesforum.org/home

Fisheries Law Enforcement and National Bio-Fact Loan Program
NOAA Fisheries Service's Office for Law Enforcement has redesigned it website to provide one location for information about the office and its protection and conservation of our nation's living marine resources. The site has useful information about marine conservation laws, public awareness campaigns, and enforcement activities. Of special note for educators is the National Bio-Fact Loan Program, which can be found under the COPPS (Community Oriented Policing and Problem-Solving) link.
http://www.nmfs.noaa.gov/ole/ole_about.html

Fisheries Learning on the Web
Project FLOW is a Great Lakes curriculum series developed by Michigan Sea Grant with support from the Great Lakes Fishery Trust. The online lessons are designed to help educators teach students about the Great Lakes through hands-on activities. The 15 downloadable lessons cover the aquatic food web and invasive species, water quantity and quality, and Great Lakes fisheries. Each lesson is aligned with state and national curriculum standards for science and social studies.
www.projectflow.us

Fisheries Legal Instruments
The International Collective in Support of Fishworkers offers Fisheries Legal Instruments, a website providing detailed information for a wide range of instruments relevant to fisheries and fishworkers. It covers 124 documents, categorized by Human Rights, Food Security, Environment and Sustainable Development, Oceans and Fisheries Management, Environmental Pollution, and more.
http://legal.icsf.net/icsflegal/home.jsp

Fisheries of the U.S. 2013
The National Fisheries Services has released its annual Fisheries of the U.S. report, detailing key fisheries statistics including landings totals for both domestic commercial and recreational fishing by species.
http://www.st.nmfs.noaa.gov/commercial-fisheries/fus/fus13/materials

Fishery Analyst Online Catch Data Maps
The Multispecies Research Group of The Virginia Marine Institute of Marine Science is now providing online access to fishery catch data via an interactive mapping application, Fishery Analyst Online. This web GIS application allows querying the catch data based on species, date, total biomass, and more. The data can be manipulated to produce charts and other visualization tools.
http://www.vims.edu/research/departments/fisheries/programs/multispecies_fisheries_research/interaction/fishery_analyst_online/index.php

Fishery Data for the Classroom
NOAA Fisheries' Alaska Fisheries Science Center Education and Outreach website offers links to a variety of fisheries data to help bring the world of fisheries science into the classroom. There are links to activities, Killer Whale, and Microworlds curricula. Be sure to check out the home page and all of the resources available through this great website.
http://www.afsc.noaa.gov/Education/Activities/data.htm

Fishery Regulations in the Wider Caribbean
This project summary report from the United Nations Environment Programme World Conservation Monitoring Centre provides information on fisheries regulations throughout the wider Caribbean region. Details of fishery regulations for each country are presented in terms of national restrictions, national zoning, and MPA-level restrictions. In addition, the website (http://gipping.unep-wcmc.org/wdbpa/caribPa/maps.cfm) has an interactive map of the fishing regulations.
http://gipping.unep-wcmc.org/wdbpa/caribPa/Fishery_Regulations_in_the_Wider_Caribbean_Region.pdf

Fishery Stock Assessments
NOAA Fisheries offers basic information about scientific fishery stock assessments with the series, The ABCs of Stock Assessment. The website also has Dive Deeper along with other stories and videos that bring understanding to the science of stock assessment.
http://www.nmfs.noaa.gov/stories/2013/06/science_stock_assessments.html

Fishes: Greater Caribbean
This free fish ID guide/database for the iPhone or iPad offers around 1600 species of Caribbean fishes and over 5500 identification images from the Smithsonian Institute. It includes more Caribbean fishes than any other current publication, providing ID photos of almost every species, as well as a note book option to annotate or keep track of your observations. Once downloaded it works independently of internet access, so it's ideal for remote dive sites.
https://itunes.apple.com/us/app/fishes-greater-caribbean/id570048678?mt=8

Fishinars
Check out the upcoming REEF webinars that help teach the finer points of identifying fish and invertebrates underwater. Upcoming fishinars highlight rockfish, New England invertebrates, and more. Free registration is required.
http://www.reef.org/fishinars

Fishing for Answers: Making Sense of the Global Fish Crisis
The goal of *Fishing for Answers* is to provide easily digestible but comprehensive fisheries information for consumers and policymakers. This report will allow consumers to make links between what they eat and the effect on the ecosystem and fishers globally, as well as to stimulate dialogues among environmentalists, the fishing industry, and consumers. The executive summary is currently available, and the full print version will be made available soon.
http://water.wri.org/pubs_pdf.cfm?PubID=3866

Fishing for Energy
Fishing for Energy is a partnership that provides a no-cost solution to fishermen to dispose of old, derelict (gear that is lost in the marine environment) or unusable fishing gear, and works to reduce the amount of derelict fishing gear in and around coastal waterways. Collected gear is transferred to a recycling facility where the metals are removed; the remaining gear is then hauled to an Energy-from-Waste facility and converted into renewable energy.
http://www.nfwf.org/Pages/fishingforenergy/home.aspx

Fishmas Greetings
Belatedly, but in the spirit of Christmas, check out the following for merry Fishmas wishes:

- Holidays Under the Sea PowerPoint to Dropbox. Check out this clever photoshopped Christmas greeting.
  https://www.dropbox.com/s/0zs5307porzdaoj/Holidays%20Under%20the%20Sea.zip
- 12 Days of Fishmas at Flower Garden Banks National Marine Sanctuary,
  http://flowergarden.noaa.gov/document_library/eddocs/12daysoffishmas.pdf

FishWatch
FishWatch provides easy-to-understand science-based facts to help consumers make smart sustainable seafood choices. The website offers information on popular seafood harvested or farmed in the United States. Topics include fish profiles, news, recipes, and more.
http://www.fishwatch.gov/
http://www.fishwatch.gov/features/fishwatch_video.html

FishWatch
NOAA's FishWatch is an online consumer seafood guide designed to facilitate informed seafood- buying decisions for consumers who are increasingly more sophisticated in their requirements for sound, accurate, and reliable information about the health and sustainability of seafood. The site has information on popular seafood species, with more species to be added shortly. The information includes population strength and status, nutritional content, and more.
http://www.fishwatch.noaa.gov

Fishy Newsletter
The May/June 2009 issue of the Long Island Sound Study newsletter, *Sound UPDATE*, focuses on fish populations in the Long Island Sound watershed, the methods for managing these populations, programs that encourage watershed residents to go fishing, and simple ways people can help keep Long Island Sound and its fisheries healthy. The newsletter can serve as a good introduction to many issues surrounding fisheries, including outreach, management, monitoring, and more.
http://www.longislandsoundstudy.net/pubs/news/spr09.pdf

Five-Minute Film Festival
Edutopia's VideoAmy curates themed playlists of YouTube videos for educators and students. Check out Teaching in a Winter Wonderland, Best Education Parodies of 2012, and more
http://www.edutopia.org/blogs/beat/five-minute-film-festival

FLASH Ocean Science Videos
COSEE Florida is working with ocean scientists to create short FLASH (FLorida Aquatic Science Heroes) video presentations featuring their research. The videos are designed to serve as resources for middle and high school instruction. They are available through YouTube and TeacherTube, and each is accompanied by additional teacher resources.
http://www.coseeflorida.org/Initiatives/community/FLASH1/

FlipQuiz
FlipQuiz is designed to help educators create gameshow-style boards to complement traditional flash cards. The features several templates, along with the ability to save the boards to the cloud. Free registration is required.
http://flipquiz.me/

Floating Classroom for Educators and Students - Texas
On the R.V. Karma, a 57-foot teaching and research vessel, students can use otter trawls, plankton nets, water samplers and test kits, bottom corers and video-enhanced microscopes to investigate topics such as marine biology, ecology, fisheries and environmental impact. Additional initiatives include Elderhostels, youth development camps and courses, marine education workshops and professional development, and short courses for informal educators.
http://extensioneducation.tamu.edu/karma.htm .

Floods - Too Much of a Good Thing
This module from the National Computational Science Leadership Program focuses on the natural disaster of flooding, covering both human and environmental influences. The website offers background information, lesson plans, an assessment, and more. While on the website, check out the other modules, including carbon cycle, Florida red tides, and much more.
http://www.ncsec.org/models.cfm
http://www.ncsec.org/cadre2/team26_2/ModulePage/default.htm

FloodSafe
This online game created by Australia's Victoria State Emergency Service can show kids exactly what might be lurking in flood waters. Players are challenged to find the dangers hiding under the water where they might otherwise want to wade. The game is quick and easy to play, and there are lessons and classroom activities to go along with the game.
http://www.ses.vic.gov.au/kids/floodsafe-game

Florida Circumnavigational Saltwater Paddling Trail
Beginning at Big Lagoon State Park near Pensacola, extending around the Florida peninsula and Keys, and ending at Fort Clinch State Park near the Georgia border, the Florida Circumnavigational Saltwater Paddling Trail is a 1,515-mile sea kayaking trail. The trail includes every Florida coastal habitat type, from barrier island dune systems to salt marsh to mangroves. A non-profit statewide support group, the Florida Paddling Trails Association, is the steward of the Circumnavigational Trail.
http://www.floridapaddlingtrails.com/
http://www.dep.state.fl.us/gwt/paddling/saltwater.htm

Florida Keys and Field Guides
The Florida Department of Environmental Protection, Bureau of Laboratories offers an online list of downloadable identification keys and field guides to a wide variety of organisms found in the state. These include amphipods, clams, leeches, snails, ferns, venomous snakes, and more. The web page also links to checklists of amphibians and reptiles and to a checklist of vascular plants of north central Florida.
http://www.dep.state.fl.us/labs/cgi-bin/sbio/keys.asp

Florida Keys National Marine Sanctuary Website Update
The Florida Keys National Marine Sanctuary Website has unveiled a facelift with updated content, functioning links, and ease of navigation.
http://floridakeys.noaa.gov/

Florida Keys Tortugas 2009
Scientists and crew on the NOAA Ship *Nancy Foster* continued the long-term study of the Florida Keys National Marine Sanctuary Tortugas North Ecological Reserve, from September 22-30, 2009. The team conducted diver and sonar surveys of benthic habitats and fishes as part of an evaluation of the impact of this no- take reserve on marine communities. Read their daily logs as they conducted research to examine habitat utilization of fishes by sampling both on and off the reef.
http://sanctuaries.noaa.gov/missions/2009tortugas/welcome.html

Florida Oceans Day
The 11th annual Florida Oceans Day, March 25, 2009 in Tallahassee, Florida, will feature exhibits on ocean economics and climate change reports of the Florida Oceans and Coastal Council, along with a roundtable discussion of ocean management.
http://www.floridaoceanalliance.org/

Florida Office of Coastal and Aquatic Managed Areas Interactive Map
The Florida Department of Environmental Protection's Coastal and Aquatic Managed Areas manages nearly five million acres of submerged lands. These include Aquatic Preserves, National Estuarine Research Reserves, and the Florida Keys National Marine Sanctuary. The website includes an interactive map of the entire state, broken down into regions.
http://www.dep.state.fl.us/coastal/sites/default.htm .

Florida Panhandle Shipwreck Trail
The Florida Panhandle Shipwreck Trail is a series of 12 shipwrecks located offshore of Pensacola, Destin, Panama City, and Port St. Joe, Florida. The trail was developed by the Florida Department of State's Underwater Archaeology Team, in partnership with Panhandle waterfront communities, to stimulate tourism and educate residents and visitors about Florida's history. The trail's interactive website features underwater videos of each shipwreck, a brief introduction, and more.
http://www.floridapanhandledivetrail.com/

Florida Shipwrecks
The National Register of Historic Places has launched a virtual travel itinerary, Florida Shipwrecks: 300 Years of Maritime History. This itinerary is currently the main feature on their homepage and highlights 13 historic shipwrecks listed in the National Register of Historic Places that are accessible to divers. The website includes an interactive map,

background information about the wrecks, and an introduction to Florida's maritime history.
http://www.cr.nps.gov/nr/travel/flshipwrecks/

Florida's Springs
Rising up from deep within the aquifer, cool clear water flows from hundreds of springs that dot the Florida landscape. This website hosts virtual explorations of some springs, information about threats to the quality and quantity of water in the Florida aquifers, and educational resources, including "Build Your Own Aquifer".
http://www.floridasprings.org/

Florida State Parks Mobile App
The Florida Coastal Access Guide is now available through a free smartphone application. The app features detailed information about each site, including accessibility, fees, and much more.
http://www.floridastateparks.org/resources/mobileapp.cfm

Flotsam and Jetsam
Flotsam and Jetsam, the Journal of the Massachusetts Marine Educators, is an online quarterly. Each issue has a central theme, such as Ocean Floor Geology, National Marine Sanctuaries, and more, and includes at least one curriculum activity. Previous years' editions are available for general view.
http://massmarineeducators.org/journal.shtml

Flow of Energy
The University of Michigan's Global Change Curriculum offers *The Flow of Energy: Primary Production to Higher Trophic Levels*, an on-line lecture about energy transfer.
http://www.globalchange.umich.edu/globalchange1/current/lectures/kling/energyflow/energyflow.html

Flow: The Essentials of Environmental Flows
IUCN and its *Water and Nature Initiative* published a new guide to "environmental flows" –the water regimes provided within a river, wetland or coastal zone to maintain ecosystems and their benefits where there are competing water uses and where flows are regulated. *Flow* includes chapters on international legal instruments, defining water requirements, covering costs, and building capacity.
http://www.waterandnature.org/flowlaunch.html

Flower Garden Banks National Marine Sanctuary
The updated Flower Garden Banks National Marine Sanctuary Website is live. Sanctuary education materials can be downloaded directly from the site's document library. Included are downloadable coloring pages, games, an educational activity, and more. Teachers can sign up for an Education List Serve, request educational materials, and stay abreast of the various workshops and seminars offered by the sanctuary.
http://flowergarden.noaa.gov/education/education.html

Flower Garden Banks National Marine Sanctuary Education Documents
A listing of free downloadable resources from the Flower Garden Banks National Marine Sanctuary is available. Check out the Sanctuary Alphabet, Critter Collages, and more.
http://flowergarden.noaa.gov/document_library/eddocuments.html

Flying WILD
Flying WILD is a new initiative from the Council for Environmental Education that extends upon Project WILD by providing resources and guides for School Bird Festivals in conjunction with International Migratory Bird Day. The program allows students the opportunity to get involved in learning through researching, planning, and hosting a bird festival at their school. Flying WILD is sponsored by the National Fish and Wildlife Foundation and Phillips Petroleum Company.
http://www.projectwild.org/flying_wild/overview.htm

Flying WILD Educator Resources on Gulf Oil Spill
To help bird educators find useful information for their classrooms about the Gulf oil spill and birds, Flying WILD has compiled an educator resource page that includes links to key websites and databases, educator tools, articles, and how to help.
http://www.flyingwild.org/resources/gulfoilspillresources.htm

FMSEA 2010 on the Web
FMSEA 2010, *Changing Reefs: Corals on Acid*, took place May 14-162010 in Key Largo, Florida. Some of the conference highlights, curricula, and other resources from speakers and participants are available for downloading from the website. Be sure to check back as additional materials are offered.
http://fmsea.org/events/conferences/2010/

FOCUS Education Campaign
FOCUS - Forests, Ocean, Climate, and Us - is a nationwide environmental education campaign improving children's understanding of the intimate connection between the health and sustainability of our water resources and the health of our planet. The partners will host a FOCUS Event, October 23, 2010, in Galveston, Texas. Students are invited to help the artist Wyland paint a mural.
http://web.me.com/dclipson1/Focus/Focus_Home.html

Focus The Nation "Teach-in"
Focus the Nation, a national teach-in on January 31, 2008, is designed to engage faculty and students across the country, with a focus on global warming solutions, for participants to get educated, organize, engage civic leaders, vote on solutions, and act. The website includes links to educational materials and more.
http://www.focusthenation.org/nationalteachin.php

Folly Beach Educator's Guide
This website, from COASTeam at the Lowcountry Hall of Science and Math in South Carolina, is designed to offer basic information on South Carolina's barrier islands. It offers background content and images for educators to use in teaching marine science. Most of the information contained in these sections is general and can be applied to any local barrier island. The site contains introductory images, animation of coastal processes, and beach activities.
http://oceanica.cofc.edu/An%20Educator%27sl%20Guide%20to%20Folly%20Beach/guide/default.htm

Food Chain
Check out the Food Chain song by the Banana Slug Band. Be sure to check out the Slugs' other great educational songs (including the Only One Ocean CD) while on the website.

http://bananaslugs.bandcamp.com/track/food-chain

Forces of Change
This website from the Smithsonian's National Museum of Natural History explores climate change, ecological change, and cultural change. Drawing on a wide range of research, the site looks at how different types of changes are affecting life on earth. Some of the processes covered include El Nino, volcanic eruptions, and changes in the atmosphere. The website includes interviews, interactive features, research reports, and more, and includes a special educators' section.
http://forces.si.edu/index.html

Forest Encyclopedia Network
Jointly developed by the USDA Forest Service Southern Research Station and Southern Regional Extension Forestry, this website has multiple online encyclopedias about the forests of the Southern United States, as well as one that covers the environmental threats facing all North American forests. The menu allows the visitor to view the site through a thematic lens, or through a global one.
http://www.forestencyclopedia.net/

Forest Service Partnership Resource Center
The Partnership Resource Center is a centralized website from the Forest Service to provide information and tools to promote partnerships. The website includes resource documents, links to training opportunities and funding sources, tools and templates, and lists of organizations and agencies which work collaboratively and in partnerships to manage natural resources.
http://www.partnershipresourcecenter.org/index.shtml .

Forming Hurricanes Poster – FL, GA, NC, SC
Help your students learn to define and describe the nature of hurricanes, as well as their regional significance in the Atlantic. This poster supports the upcoming SEACOOS Virtual Hurricane Classroom that will soon be found on the SEACOOS website. On this website you will be able to find classroom activities, locate real time hurricane information on the web, learn hurricane vocabulary, and more.
http://seacoos.org/Community%20and%20Classroom/

For Sea
The FOR SEA marine science curriculum and teacher training program offers materials and teaching strategies with middle school/junior high school curriculum, a career awareness in science curriculum, and environmental education curriculum. The website offers tables of contents and examples of available materials.
http://www.forsea.org/Default.htm

For The Sea
For The Sea Productions was created to promote marine environmental protection via visual experience. The website offers video and photos to engage, entertain, and raise awareness of the critical need for conservation of the oceans. The Hawaii Reef Etiquette PSA is available for downloading in English and Japanese.
http://www.forthesea.com/

Forest Service Climate Change Articles and Activities
The U.S. Forest Service offers the *Natural Inquirer* for middle school and the *Investigator* for upper elementary school students. Recent issues deal with climate change and can be downloaded from the website. Classroom sets can also be ordered so that each student has their own copy.
http://www.scienceinvestigator.org/Pacific-Northwest-Research-Station-Climate-Change-Edition-i-3.html
http://www.naturalinquirer.org/

Fostering Sustainable Behavior
Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing describes effective strategies for getting people to change very specific environmental behaviors. While focusing on positive details of information, incentive, commitment, and community that can entice folk to do the right thing, the book also looks at barriers to behavior change. The book can be read online. Check out the website for additional resources.
http://www.cbsm.com/pages/guide/preface/

Foundation Center
The Foundation Center offers information about philanthropy worldwide. Through data, analysis, and training, it connects people who want to change the world to the resources they need to succeed. The center maintains a database on U.S. and global grantmakers and their grants.
http://foundationcenter.org/

The Fragile Fringe
The USGS National Wetlands Research Center offers The Fragile Fringe, a Guide for Teaching about Coastal Wetlands, a downloadable teaching guide. The intent of this material is to provide a basis from which a comprehensive study of coastal wetlands can be developed by the teacher on the basis of individual needs. The site includes background information, suggested activities, glossary, references, and a reading list. Activities can be demonstrated by the teacher or performed by students.
http://www.nwrc.usgs.gov/fringe/ff_index.html

Framework for Assessing Environmental Literacy – Washington, D.C. and Online
Join the North American Association for Environmental Education and partners on December 1, 2011 for the release of *A Framework for Assessing Environmental Literacy* in Washington, D.C., and live via the Internet. This new framework for assessing environmental literacy was developed with experts from the fields of environmental education, social studies education, science education, and related policy and social science fields.
http://www.naaee.net/framework

Framework for Evaluating Impacts from Informal Science Education Projects
The report, *Framework for Evaluating Impacts from Informal Science Education Projects,* is available for downloading from the Center for Advancement of Informal Science Education. It provides the results from a National Science Foundation-sponsored workshop on evaluating informal education.
http://insci.org/

Framework for a National System of Marine Protected Areas
The United States has developed a national system of marine protected areas to advance the conservation and sustainable use of the nation's vital natural and cultural marine resources. The national system is described in detail in the downloadable *Framework for a National System of Marine Protected Areas for the United States America*.
http://mpa.gov/national_system/national_system.html

Frank Potter's Science Gems
Dr. Frank Potter offers this website with over 14,000 science resources sorted by category, subcategory, and grade level. Each of these sections is divided into smaller areas by grade level and each entry has a brief description of the noted resource.
http://www.sciencegems.com/

Free Copy of Green Teacher
To celebrate the launch of an electronic edition of their non-profit quarterly EE magazine, Green Teacher invites you to download a copy of the Winter 2006-2007 edition, through July 1, 2007. The electronic issue is searchable and the hot-links provide readers with quick access to additional information about a topic or new educational resources mentioned in that issue. Check out the article, *Discovering Lake Management: Getting Students' Feet Wet*.
http://www.greenteacher.com/freeIssue80.html

Free Use of Camping Equipment Through The REI Gear Bank
The REI Gear Bank is a program designed to facilitate a positive introduction to the outdoors for kids who have not yet had a wilderness experience. In order to ensure that their first experience in the outdoors is a positive one, REI has set up a program to provide kids with quality gear so they are comfortable and can focus on having fun. The Gear Bank offers camping essentials free of charge.
relion@rei.com

Free Science "Stuff" for Teachers
This wiki-style page from Science Inquirer offers free teaching resources from listservs, podcasts, videos, posters, and more.
http://scienceinquirer.wikispaces.com/freestuff

Free Underwater Images
This website promotes increased awareness of the marine environment by allowing users to download free, high quality underwater photos. All images are in the public domain and free for any use without prior written permission and without fee or obligation. Images can be used for any non commercial purpose.
http://freeunderwaterimages.com/

Free VHS Tapes
Flower Garden Banks National Marine Sanctuary has VHS copies of Reef Rendezvous (unnarrated highlights from the sanctuary), along with several other titles. The tapes will be given away on a first come, first served basis.
Contact Shelley.DuPuy at Shelley.DuPuy@noaa.gov

Free Worksheets for Teachers
Teachnology offers printable K-12 teacher worksheets and other resources free to use and distribute for educational purposes. Science topics include oceans, environment, and more. Other resources include teacher templates, a worksheet maker, and more.
http://www.teach-nology.com/worksheets/

Freebies for Science Teachers
NSTA offers Freebies for Science Teachers, with links to books, lessons, and more. Check out the Ocean Literacy Short Course, Free Technology for Teachers, and more.
http://www.nsta.org/publications/freebies.aspx

French Frigate Shoals Expedition Archive
The Census of Marine Life, Census of Coral Reefs Expedition to French Frigate Shoals from October 2006 can be viewed on the Northwestern Hawaiian Islands Multi-Agency Education Project website. . Read the ship logs, journals, and scientist interviews. There's plenty of other information, including maps, photos and more.
http://www.hawaiiatolls.org/research/CoML/index.php
http://www.creefs.org/

French Polynesia Expeditions
As part of the Global Reef Expedition, a six year voyage to characterize key coral reef habitats around the world, the Living Oceans Foundation will be in French Polynesia for three additional missions - mid-November to mid-December, mid-January to mid-February, and the final leg from mid-March to mid-April. Once completed, the expedition will continue to the Austral and Cook Islands in May. Check out the blogs and follow along through the website.
http://www.globalreefexpedition.org/

Fresh and Salt Curriculum
Explore the world of water and spice up your classroom with a little *Fresh and Salt*, a collection of activities connecting Great Lakes and ocean science topics to enhance teacher capabilities for accessing science information in Great Lakes and ocean sciences. A varied range of instructional modes is offered, including data interpretation; experimentation; simulation; interactive mapping; and investigation.
http://coseegreatlakes.net/curriculum/

Freshwater Ecoregions of the World
Freshwater Ecoregions of the World provides a global biogeographic regionalization of the Earth's freshwater biodiversity. This ecoregion map, together with associated species data, can be a useful tool for underpinning global and regional conservation planning efforts, particularly to identify outstanding and imperiled freshwater systems; for serving as a logical framework for large-scale conservation strategies; and for providing a global-scale knowledge base for increasing freshwater biogeographic literacy.
http://www.feow.org/index.php

Freshwater and Marine Image Bank
The University of Washington Libraries offers 21,000 digitized images of freshwater and marine life taken from 1735-1924 from various publications. Visitors can browse by collection and subject, or enter search criteria. There are also links to other sources for digital images.
http://content.lib.washington.edu/fishweb/index.html

Frog Calls
This website, sponsored by the Chicago Herpetological Society, offers frog calls and documentary video clips of scientists discussing frog issues, including declining amphibians and malformed frogs.
http://www.midwestfrogs.com/

Frogwatch USA
Frogwatch USA is a long-term frog and toad monitoring program that gives volunteers the opportunity to help scientists conserve amphibians, managed by the National Wildlife Federation in partnership with the United States Geological Survey. The website offers frogwatching tips, field guides, and much more. The website offers very easy-to-access frog call identification for your state through links to the eNature website.
http://www.nwf.org/frogwatchUSA/

From the Bow Seat
The Gulf of Maine Marine Education Association and independent film maker Linda Cabot offer to share the film, *From the Bow Seat*. The film profiles a voyage of discovery of a mother and her teenage daughters as they seek out people engaged in understanding and protecting the living resources of the Gulf of Maine. Educators can request a free copy of the DVD.
http://www.fromthebowseat.org/contest/info.php

From the Serengeti to Austin Texas - Watching Wildlife is Bringing in the Bucks
Wildlife Watching and Tourism: A study on the benefits and risks of a fast growing tourism activity and its impacts on species was launched at the meeting of the Convention on Biological Diversity in Curitiba, Brazil. The report focuses on 12 case studies to highlight the growing economic importance of wildlife watching while flagging some of the pitfalls that may arise through poor or insensitive management. Concrete recommendations are made on how best to promote environmentally, economically, and socially sound wildlife watching, including advice to visitors, drivers and divers.
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=471&ArticleID=5238&l=en

From Sea to Shining Sea
The National Geographic Society and NOAA's Office of Ocean Exploration have collaborated to create an ocean focused map, *From Sea to Shining Sea, Exploring America's Ocean Realms*, along with three new online lesson plans. In addition, there a limited number of paper versions of the map. If you would like to receive a copy of this map, please send an email to fcava@ngs.org with "Request a copy of the Sea to Shining Sea map" in the subject line.
http://nationalgeographic.com/xpeditions/lessons/15/g68/seatoshiningsea1.html
http://nationalgeographic.com/xpeditions/lessons/08/g68/seatoshiningsea2.html
http://nationalgeographic.com/xpeditions/lessons/15/g68/seatoshiningsea3.html
http://nationalgeographic.com/xpeditions/lessons/15/g68/s2ssmap.pdf

From Shore to Sea: Exploring California's Channel Islands
The JASON Project combines scientific expeditions, standards-based classroom curriculum, and accredited professional development for teachers to engage students in science, math, and technology, and to deliver measurable gains in student achievement. *From Shore to Sea* focuses on the Channel Islands and the surrounding

sea. Monitor change with standards-based lesson plans covering geography, natural history, culture, watersheds, kelp forests, marine conservation and much more.
http://channelislands.noaa.gov/edu/shoretosea.html .

From Shore to Sea Lecture Series - California
Channel Islands National Marine Sanctuary and National Park celebrate their 25- year anniversaries with this year's lecture series by featuring speakers who have made significant contributions to the park and sanctuary. The programs, free and open to the public, will take place on the second Tuesday and Wednesday of the month.
http://channelislands.noaa.gov/edu/shoretosea.html

From the Top of the World...to the Bottom of the Food Web
These four teaching units show how NASA satellites measure ocean productivity. Topics cover marine food webs; phytoplankton diversity, classification and adaptations; studying photosynthesis with technology from microscopes to satellites; and biology of algal blooms. The units include background information, lesson plans using on-line data or instructions for classroom and field activities, and web links for further study.
http://www.bigelow.org/foodweb/

Frontier Scientists
The Frontier Scientists website allows visitors to observe breaking scientific news from leading Arctic scientists in archaeology, marine biology, ecology, and more in order to excite the general public about ongoing science in Alaska and the Arctic. Check out the extensive list of videos covering archaeology, climate change, and much more.
http://frontierscientists.com/

Fueling the Future
Help your students understand energy issues using the new Facing the Future activity, Fueling the Future. Students compare energy use and CO2 emissions by sector in the United States and China (and optionally in another country). They research and discuss energy impacts and sustainable energy solutions and present their findings at a "World Energy Summit." Additional materials available from Facing the Future include water trivia, Got Water? and more.
http://www.teacherscorner.org/activities.html#

Fun eReader Picture Books
Sylvan Dell offers an iPad app for all of their books. In line with their previous generous offers of free access to their resources, they are giving free access to ALL of their "science and math through literature" books for 30 days from October 9, 2012. Whether using with young children in your personal lives, as a teacher in a classroom, or as an aquarium educator, check out the books on your iPad or computer.
https://itunes.apple.com/us/app/id500641356?mt=8
http://www.sylvandellpublishing.com/index.php

The Fun Theory
This initiative from Volkswagen is dedicated to the thought that something as simple as fun is the easiest way to change people's behavior for the better. Check out the videos on the website to spark your imagination, and create a new way of encouraging sustainable behavior. The contest for new ideas is open until December 15, 2009.
http://www.thefuntheory.com/

Fusion Tables
Google has launched a new online tool enabling free data-sharing that could aid with international scientific research collaborations. The tool, Fusion Tables, allows tables of data to be visualized as charts, graphs, and maps, which can help identify patterns and trends. Users are able upload their data and make the information freely available to anyone, opening up possibilities for collaboration.
http://www.scidev.net/en/news/online-tool-could-aid-global-collaboration.html

Future Earth
Future Earth is a four-part series on the environment from MSNBC. The website offers preview clips of upcoming shows, video quizzes, and many informative video clips. Check these videos out.
http://www.msnbc.msn.com/id/29840099/ns/msnbc_tv-future_earth

Future of Reefs in a Changing Environment
The Future of Reefs in a Changing Environment (FORCE) research project takes an ecosystem approach, linking social and ecological aspects towards managing Caribbean coral reefs in the face of climate change. Much of the website is available in English or Spanish. Materials include Towards Reef Resilience and Sustainable Livelihoods: a handbook for Caribbean reef managers, Compendium of Management Measures, and more.
http://www.force-project.eu/

The Future of Sustainability
The World Conservation Union (IUCN) is hosting *The Future of Sustainability: Have Your Say!.* an e-discussion forum between August 21-September 15, 2006. The four themes are global challenges to sustainability, human wellbeing and sustainability, the new economy and biodiversity, and shaping the future. A summary of the e-Discussion Forum will made available on the website later this year.
http://www.iucn.org/members/future_sustainability/

FWS Northeast Region Youth Blog
The Northeast Region recently launched a youth blog series that focuses on youth in the Fish & Wildlife Service and their experiences. This blog highlights some of the activities young employees and interns engage in during the busy field season and at the same time shares information about different programs, all from the perspective of those involved. It also highlights some of the ways youth can get involved with FWS.
http://usfwsnortheast.wordpress.com/2013/07/10/young-n-wild/

FWS Science Excellence
The goal of the FWS's Science Excellence is to strengthen the service's tradition of scientific excellence in the conservation of fish, wildlife, plants, and their habitat. The website offers links to resources and Science in Action topics, including climate change, habitat conservation, and more.
www.fws.gov/science/index.html

GalAPAGoS: Where Ridge Meets Hotspot
The *GalAPAGoS* (Galapagos Acoustical, Plumes, and Geobiological Surveys)*: Where Ridge Meets Hotspot 2005* Expedition, from December 3 through January 10, 2006 sponsored by NOAA's Office of Ocean Exploration, offers education opportunities for teachers, students, and the general public to virtually join a team of scientist, explorers,

and educators as ocean explorers investigate a 400 km-long section of the Galapagos Spreading Center which is part of the global mid-ocean ridge system.
http://oceanexplorer.noaa.gov/explorations/05galapagos/welcome.html

Galleries of Change
NASA's Climate Kids presents eight galleries that show rapidly changing climate conditions on our planet. This visual tool offers the chance to explore climate change by highlighting key areas such as weather and climate, oceans, and more.
http://climatekids.nasa.gov/search/gallery/

Galveston Bay Environmental Curriculum
Artist Boat Eco-Art educators developed these lessons, activities, and practicum with funding from the Texas Education Agency and NOAA's B-WET program. The lessons are available online for downloading. Lessons include background information, pre-lessons, post-lessons, and extension activities in art, science, social science, and more. Be sure to check out the many other resources available on this website.
http://www.artistboat.org/Galveston_curriculum.html

Galveston Bay Information Center Resources
The Galveston Bay Information Center and the Galveston Bay Estuary Program have teamed up to provide resources you can use to teach the science of the bay area in your classroom. The website offers curriculum focusing on oceans, estuaries, and bays. The Resources for Teachers webpage contains free resource materials for use in your classroom including links to locally designed curriculum, classroom presentations, links to local field trip opportunities, and more.
http://gbic.tamug.edu/

Games for Science
Scientists are using video games to tap the collective intelligence of people around the world, while doctors and educators are turning to games to treat and teach. Check out this article from The Scientist for a brief introduction to serious games.
http://www.the-scientist.com/?articles.view/articleNo/33715/title/Games-for-Science/

Games at NOAA
With summer here, it's a good time to once again highlight this portal to games and interactive activities focused on ocean and air themes. The games highlight the science and the activities of the NOAA and other agencies and organizations promoting environmental stewardship. Be sure to check out WaterLife, the Humpback Whale Migration Game, Storm Tracker, and more.
http://games.noaa.gov/

Games Planet Arcade
This arcade from NOAA is a portal to games and interactive activities focused on ocean and air themes. It highlights the science and the activities of NOAA and other agencies and organizations promoting environmental stewardship. There are puzzles, interactives, and links to in-depth learning games.

Gateway to Educational Materials
The Gateway to Educational Materials offers a database of more than 24,000 education resources, including marine resource education, across more than 400 web sites.
http://thegateway.org/

Gather: The Art and Science of Effective Convening
The Rockefeller Foundation, along with the Monitor Institute and Monitor Deloitte, provides this guidebook for the purpose of assisting groups who are in the beginning stages of planning a convening, an event which asks groups of people to come together for a short time to accomplish a shared goal for an organization or for the greater good. The guidebook outlines the detailed thought processes and planning that should be done before deciding to organize such an event, along with how to organize one.
http://www.rockefellerfoundation.org/bellagio-center/gather-art-science-effective

GCCA Workshops
The Global Climate Change Alliance (GCCA) website hosts training materials and presentations from its workshops, held in the Caribbean, Pacific, and elsewhere. The workshops offer training on mainstreaming climate change into national development planning and budgeting.
http://www.gcca.eu/pages/40_2-The-Workshops.html

GCFI/CaMPAM Reference List
This reference list from CaMPAM and GCFI offers hyperlinks to downloadable publications on MPA science and practice in the Caribbean. The e-library includes information materials published on the Internet ranging from research papers to technical reports, pamphlets, brochures, and web sites, grouped by subjects related to marine conservation science and practice. Topics include best marine management practices, coral reefs, ecological services, MPA financing, and much more.
http://campam.gcfi.org/CaMPAMLibrary.php

GEF Lessons Learned E-Group
The Knowledgebase for Lessons Learned and Best Practices in the Management of Coral Reefs project aims to formalize the experiences, outcomes, and lessons learned from previous Global Environment Facility projects, as well as major initiatives involving coral reefs and associated ecosystems. This e-group creates a forum where experiences in Caribbean coral reef management can be exchanged, facilitating information sharing and discussions regarding coral reef management in the Caribbean.
http://tech.groups.yahoo.com/group/gefll/

GEF Lessons Learned Project
The GEF-funded project *Knowledgebase for Lessons Learned and Best Practices in the Management of Coral Reefs* seeks to formalize the experiences and lessons learned from previous GEF projects, as well as major non-GEF initiatives, involving coral reefs and associated ecosystems. The downloadable *GEF Lessons Learned and Best Practices* Toolkit is a place to find information about how to design and implement coral reef management strategies; it will be updated quarterly.
http://www.reefbase.org/gefll/

GecoServ
The Harte Research Institute's Socio-Economics Group supports GecoServ, an online Gulf of Mexico Ecosystem Services Valuation Database. Goals of the database are to distribute and share information about ecosystem services valuation studies relevant to Gulf of Mexico region, and to identify current gaps in the literature. The studies summarized are for habitats that are relevant to the Gulf region even though they may have been conducted elsewhere.

http://www.gecoserv.org/

generationOn
generationOn focuses on igniting the power of all kids (preK-12) to make their mark by creating meaningful change in the world. The core of the program includes service-learning and volunteer action. The linked Learning to Give website offers links to lesson plans for all grade levels on different topics, including the environment.
http://www.generationon.org/

A Gentle Introduction to GIS
This book contains what beginners need to know about mapping terminology and digital mapping, how to locate geographic features and analyze their patterns, and more. The free, downloadable book uses bookmarks to allow easy navigation among the chapters.
http://www.geotechcenter.org/Resources/Resource-Center/Textbooks/A-Gentle-Introduction-to-GIS

GEO Year Book 2003
The United Nation's Environment Programme (UNEP) presents its first annual Global Environment Outlook (GEO) statement to highlight significant environmental events and achievements during the year and raise awareness of emerging issues from scientific research and other sources. Based upon a collaborative/comprehensive tracking and stocktaking process established with many partners, it includes an overview of major global and regional environmental issues, a focus on freshwater, indicators and more.
http://www.unep.org/geo/yearbook/ .

GeoBirds
Geobirds is meant to be an online birding community. The "BirdBrain" interface allows users the opportunity to navigate around the United States to begin determining which type of bird may have been spotted. Web visitors can also add bird-watching data to an interactive map of North America. The website includes an online field guide, complete with photographs and descriptions.
http://geobirds.com/

Geodesy Tutorial
This online tutorial from the University of New Brunswick provides an introduction to the science of geodesy, the discipline that deals with the measurement and representation of the earth, in a three-dimensional time varying space. Topics include its history, the relationship between geodesy and other science disciplines, and the profession and practice of geodesy. There is also information on coordinate systems, point positioning, relative positioning, geodetic networks, a list of references, a glossary, and much more.
http://gge.unb.ca/Resources/GeodesyTutorial.pdf

Geographic Data in Education (GEODE)
The Geographic Data in Education (GEODE) Initiative, for middle school through college, uses data visualization and analysis tools to support inquiry-based learning. An integrated program of research and development, the GEODE Initiative provides curriculum, educational software, and teacher professional development. Software includes *WorldWatcher* and *My World*. Curriculum includes *Looking at the Environment* and *Planetary Forecaster Project*.
http://www.worldwatcher.northwestern.edu/ .

Geographic Names Information System
The Geographic Names Information System, developed by the USGS in cooperation with the U.S. Board on Geographic Names, contains information for almost 2 million physical and cultural geographic features in the United States, its territories, and the Antarctica. The federally recognized name of each feature described in the data base is identified, and references are made to a feature's location by state, county, and geographic coordinates.
http://geonames.usgs.gov/

Geography Awareness Week 2010: Freshwater
Explore fresh water, November 14–20, 2010, during Geography Awareness Week. This website from National Geographic and partners invites teachers and students to check out the games, activities, and lessons about freshwater. The website features a free download of the National Geographic digital edition from April 2010, *Water: Our Thirsty World*, a *Where's that Water?* quiz, and more.
http://www.mywonderfulworld.org/gaw.html

Geography 4 Kids
This interactive website from the American Geological Society offers younger learners a chance to discover topics in earth science, meteorology, and general science including earth structure, climates, and more. .
http://www.geography4kids.com/

Geoguesser
Explore the world with this online game. GeoGuessr is a geography game which takes you on a journey around the world and challenges your ability to recognize your surroundings. Use your geo-sleuthing to guess where you are.
http://geoguessr.com/

Geologic Heritage in the National Parks
Geologic Heritage encompasses the significant geologic features, landforms, and landscapes which are preserved for the full range of values that society places on them, including scientific, aesthetic, cultural, ecosystem, educational, recreational, tourism, and other values. Check out the featured programs for park geology tours, fossil resources, and more.
http://www.nature.nps.gov/geology/geoheritage/index.cfm

Geology of National Parks
This website from the U.S. Geological Survey draws on thousands of historic and contemporary photographs, views, documents, and other items, creating 3D and photographic tours of dozens of national parks. Visitors will find an alphabetical list of the parks, along with links to the 3D image galleries, standard image galleries, and selected online field guides. Dig out your 3D glasses and check out Puuhonua o Honaunau National Historic Park and Point Reyes National Seashore, among others.
http://3dparks.wr.usgs.gov/

GeoMentor Program
National Geographic and ESRI have created this program to inspire educators and community members to work together to improve student learning. The GeoMentor program is designed to inspire volunteers to work with a teacher or youth club leader to help kids see, use, and do more geography in and out of classrooms.

http://edcommunity.esri.com/geomentor/

GeoQ Newsletter
The European geosciences Union publishes GeoQ, an online quarterly newsletter. GeoQ #8, the December 2013 issue, is a dedicated Climate Issue. The newsletter can be downloaded from the website, or select individual sections from the online Table of Contents. While on the website, check out the additional publications and offerings.
http://www.egu.eu/newsletter/

Georgia Coast Saltwater Paddle Trail
The Georgia Coast Saltwater Paddle Trail action plan is provided as a resource for paddlers planning a trip to see the natural beauty of Coastal Georgia. This document can serve as a guide to provide trip planning information including marked routes, access points, amenities, safety information, and links to other paddling resources. It is highly recommended that potential visitors use the services of guides as there is no substitute for local knowledge in the vast marshes of the Georgia Coast.
http://www.crc.ga.gov/docs/bluewayplanfinal.pdf

Georgia Standards Website
The Georgia Department of Education offers the GeorgiaStandards.Org website, a gateway to education and professional resources to support teaching and learning in Georgia. It offers access to curriculum frameworks by subject and grade along with resources, tools, and web links commonly used by teachers. A variety of environmental education lessons are posted, including *A whale of a movement*, *Water cycle skit*, and much more.
http://www.georgiastandards.org/

Georgia's Amazing Coast
Fun and learning come together in *Georgia's Amazing Coast*, a collection of one hundred short, self-contained features about the flora, fauna, and natural history of Georgia's coast. Each page includes a full-color illustration and fact-filled commentary on coastal wildlife, from fifty-foot-long northern right whales to single-cell plankton. Contact Allison Reid at areid@ugapress.uga.edu for details.

Georgia Encyclopedia
The New Georgia Encyclopedia provides an accessible, authoritative source of information about people, places, events, historical themes, institutions, and many other topics relating to the state. It includes a section on Land and Resources, including articles and information on ecological functions of the environment, environmental regions of Georgia, and more.
www.georgiaencyclopedia.org .

Georgia High School Envirothon
The Envirothon is a hands-on, high school academic competition on the environment. Teams exercise their training and problem-solving skills in a competition centered around five topics: soils/land use, aquatic ecology, forestry, wildlife, and a current environmental issue. There are three levels of competition. The regional competition is a one day event, while the state competition is a 2-day event. There is also Eco-Meet, a middle grades academic competition on the environment modeled after the Envirothon.
www.georgiaenvirothon.org .

Georgia River Posters
Brown's Guide to Georgia now offers the popular Georgia river posters online. Each of the 14 posters may be viewed in detail on the computer in pdf format, printed in small format on a desktop printer, or sent to a local print shop and reproduced in full 24-inch X 36-inch format. The posters tell the story of each river basin through illustrations, graphics, and text.
http://brownsguides.com/srl/georgia-river-posters/

Georgia Videos
The new Georgia Department of Natural Resources Video Library is available online. Watch over 50 online videos on topics such as Wildlife/Nature, Conservation, State Parks/Historic Sites, and more. Check out Edge of Extinction, Sapelo: An Island in Time, and more.
http://gadnr.edvid.org/index.php?option=com_edv&task=top.display

GeoSource K-5
This website, hosted by the American Geological Institute, offers online Earth science professional development for K-5 teachers. Topics include weather, climate, water, and more. In addition, the website offers classroom activities, career information, assessment tools, and more.
http://www.k5geosource.org/index.html

Geospatial One-Stop Portal
The Geospatial One-Stop portal helps the public and government agencies access geospatial data and other information from one centralized location. NOAA manages the *Oceans and Estuaries* and *Locations and Geodetic Networks* channels on the portal, and co-manages the *Atmospheric and Climate* channel.
http://www.geodata.gov/gos

Geospatial Technology Education Resource Compendium
The Educator Resource List from the Geospatial Information and Technology Association is a compilation of resources for educators to learn and explore geospatial technology. Descriptions and links are available for: Educational Programs from Geospatial Vendors; Lessons and Tutorials; Careers in Geospatial Information Technology; and more.
http://gita.org/about-gita/committees/GITA_Educator_Resource_List.pdf

Geotagger 1.1
Photographers with a keen interest in spatial analysis (and appropriate photographs) might find this freeware useful. With Geotagger 1.1 and Google Earth, users can take their digital photographs, insert GPS coordinates into the images, and place them online.
http://craig.stanton.net.nz/software/Geotagger.html

GeoTech
The GeoTech Center is a collaborative effort between colleges, universities, and industry to expand the geospatial workforce. The resources website offers link to best practices, textbooks, curriculum, and more. Check out the Earthquake Hazards Module, Environmental & Culture Module, and more.
http://www.geotechcenter.org/Resources/Resource-Center

GEOTRACES Webinar Series
This four-part GEOTRACES webinar series will focus on several trace elements and what they can tell us about biogeochemical processes, the carbon cycle, and climate. Nine scientists, each studying a unique facet of the ocean's chemistry, will share their work and the importance of researching these elements in the ocean. Free registration is required. The webinars will be archived for future viewing.
http://cosee.umaine.edu/programs/webinars/upcomingwebinars/

Get Hip to Habitat
Get Hip to Habitat is a program of the Galveston Bay Foundation that brings education and marsh restoration initiatives together in one program. The foundation works with students and teachers to establish a salt marsh wetland nursery on their school campus grounds and later transplant their established grasses to Galveston Bay wetlands.
http://galvbay.org/education_gethip.html

Get To Know
The Get to Know Society's mandate is to promote environmental education in order to raise a generation of Canadians who are inherently aware of their impact on the environment and how their positive interaction with their local wildlife can help preserve our natural wonders for generations to come. The website offers webinars, a contest, and more.
http://www.get-to-know.org/

Getting The Picture: Our Changing Climate
Getting The Picture: Our Changing Climate is a multimedia tool for climate education. Photographer James Balog and his team offer archives of media, film, photography and first-hand accounts of the Earth's changing climate. Scroll over and click on the numbers to enter the website to view graphs, charts, photos and more. The resources for teachers and students offer links to a variety of additional climate change websites.
http://www.gettingthepicture.info/

Getting in Step: a Guide to Effective Outreach in Your Watershed
The *Getting in Step* guidebook or on-line web-based training module provides some of the tools needed to develop and implement an effective watershed outreach plan. It helps watershed practitioners trained in the sciences address public perceptions, promote management activities, and inform or motivate stakeholders.
http://www.epa.gov/owow/watershed/outreach/documents/

Getting WILD About Environmental Literature
The University of Texas at San Antonio, in collaboration with the Texas Parks and Wildlife Department, has put together this compilation of literature readings with annotations for all levels that align to the Project WILD activities. Check out this useful resource.
http://www.naaee.org/photos/news-images/gettingwildaboutenvliterature.doc

Ghost Crab Trap Removal Program
The Barataria-Terrebonne National Estuary Program is supporting this Department of Wildlife and Fisheries' program through a ghost trap "sweep" within the Barataria-Terrebonne National Estuary, planned for February 28 through March 14, 2004. A ghost crab trap may be an old, bent, barnacle-encrusted trap without a buoy or float, or even

be a relatively new trap with a line and buoy still attached (sometimes referred to as "derelict" traps).
http://www.blue-crab.net/derelict.html .

Ghostbusting in the Chesapeake
Through a special program at the Virginia Institute of Marine Science's Center for Coastal Resources Management, scientists are working with watermen to collect derelict, or "ghost," crab pots and fishing nets that have been lost or abandoned at sea. When fishing gear is not actively worked, it continually catches animals which typically cannot escape, therefore trapping them until they die. This bycatch of sorts can include crabs, fish, diving birds, and turtles. The watermen involved in this project were unable to work the water because of new winter crab-dredging regulations. They were provided training and tools to locate, retrieve, and document the collected fishing gear, and paid for their time and fuel. In the latest Data Analysis Teaching Activity (DATA) from the Bridge, students explore catch data collected by the watermen from the ghost pots. Bridge-authored DATAs utilize real online scientific data from research projects all over the country. They present data in an organized, controlled format, which allows for easier analysis and comprehension, and are aligned with the National Science Education Standards.
http://www.marine-ed.org/bridge/ghostpots.html

Giant Squid Curriculum Module
The Smithsonian Institution's National Museum of Natural History, Mississippi State University, and partners offer this on-line Giant Squid Curriculum Module. Lessons in the module are related to information in the web pages of the Smithsonian Institution's National Museum of Natural History. Educators are encouraged to visit three websites prior to considering the lessons; two of the links are old but newer ones are below.
http://giantsquid.msstate.edu/index2.html
http://www.mnh.si.edu/natural_partners/squid4/
http://www.mnh.si.edu/cephs/

Giovanni
Giovanni is a web-based application developed by the NASA's Goddard Earth Sciences Data and Information Services Center. The website provides a simple and intuitive way to visualize, analyze, and access Earth science remote sensing data without having to download the data. Interfaces include Atmosphere, Environment, Ocean, and Hydrology. Check out the users' manual, informational brochure, and other useful references available to help newcomers make the best use of this website.
http://disc.sci.gsfc.nasa.gov/giovanni

Girl Scouts Forever Green
Girl Scouts Forever Green, Girl Scouts' 100th Anniversary Take Action Project, is a global effort by girls to lead their families, schools, and communities in improving the environment and protecting natural resources. The initiative invites girls to engage others in taking action on three month-long projects in February, March, or April - Reduce Waste, Earth Hour, and Rain Gardens - and throughout the year.
http://www.girlscouts.org/gsforevergreen/

GIS 2 GPS Portal
This website, GIS 2 GPS Portal Resources For Educators & Students, was developed by educators in Illinois to help educators and students understand geospatial technologies. Resources include links to courses, collaborators, software, and more.
http://gis2gps.com/

GIS Day 2003
GIS Day, Nov. 19, 2003, is part of the National Geographic Society's initiative, Geography Action, a year-long initiative encompassing key educational achievements. The theme of this year's Geography Awareness Week, November 16-22, 2003, is "Habitats."
http://www.gisday.com/index.html

GIS Day 2006 – New Hampshire
The University of New Hampshire hosts GIS Day on November 1, 2006 with a geo-spatial science career and educational presentations, professional mapping exhibitions, hands-on activities, and more. This year's featured GIS Day map exhibition is the NOAA Ocean Mapping and Ocean Exploration cartographic exhibition.
http://gisday.sr.unh.edu

GIS for Kids
The book *20 Minute GIS for Young Explorers* and accompanying materials are for grades 3-5 and use the free ArcGIS Explorer Desktop platform. There are twelve cross-curricular activities with focuses in Social Studies, Science, Language Arts, and Math. The hands-on lessons introduce young learners to geospatial technologies with little to no technology learning curve.
http://gisetc.com/shop/index.php?main_page=product_info&cPath=4&products_id=86

GIS at Lane Community College
Lane Community College offers geospatial education across the curriculum for college and high school students. Web-based GIS modules are designed to engage students in real-world scenarios that teach geospatial thinking while reducing the complexities of traditional desktop GIS. MAPS-GIS focuses on embedding web-based GIS learning modules across curriculum. GeoSTAC is a professional development opportunity for Language Arts, Math, Social Science and Science high school teachers.
http://gis.lanecc.edu/

GIS and Problem-Based Science in the Classroom
Foothill College has partnered with San Jose State University to bring web mapping technology to the high school and college classroom. The website includes two GIS modules, *An Introduction to GIS on the Web* and *Water and Fish*. There are sample exercises, PowerPoints, teacher resources, background materials on biodiversity, and more.
http://www.foothill.edu/fac/klenkeit/nsf/

GIslands 2010 Downloads
GIslands 2010 was an International Summer School on Geotechnologies applied to Marine Spatial Planning, funded by the Science, Technology and Equipment Secretary of the Azores Regional Government, and organized by the Geographical Information & Territorial Planning Centre at University of the Azores. The website offers pdf downloads of the lecture slides.

http://www.gislands.org/index.php?option=com_content&view=article&id=20&Itemid=20

Glacial Balance
The film, Glacial Balance, is a country-by-country journey along the spine of the Andes, providing a narrative of climate change impacts on communities. The goal of the film is to communicate scientific concepts in understandable language through edits of long-form interviews with locals and scientists during the journey. The 2-set DVD is available on a sliding scale fee schedule.
http://www.glacialbalance.com/

Glaciers
This interactive feature from WGBH offers an introduction to glaciers, including where and why they form, what influences their growth and decline, and more. A background essay and discussion questions are included, along with links to related topics.
http://www.teachersdomain.org/resource/ess05.sci.ess.earthsys.glaciers/

Global Amphibian Assessment
The Global Amphibian Assessment is a comprehensive assessment of the conservation status of the world's 5,743 known species of frogs, toads, salamanders, and caecilians. This website presents results of the assessments, including IUCN Red List threat category, range map, ecology information, and other data for every amphibian species.
http://www.globalamphibians.org/

A Global Analysis of the Effectiveness of Marine Protected Areas in Preventing Coral Loss
A recent paper in *PLoS One* examined surveys conducted in over 300 tropical MPAs for a meta-analysis, concluding that MPAs can be effective at preventing coral loss, especially after they have been established for a while, and argues that MPAs can be effective at increasing coral-reef resilience.
http://www.plosone.org/article/info:doi/10.1371/journal.pone.0009278

Global Biodiversity Information Portal
The Global Biodiversity Information Facility (GBIF) is an international non-profit organization devoted to providing free and universal access to data regarding the world's biodiversity. Check out the GBIF Communications Portal at www.gbif.org . Many countries and organizations participate in GBIF and have made their data available at the GBIF Data Portal.
www.gbif.net .

Global Biodiversity Outlook
Global Biodiversity Outlook is the flagship publication of the Convention on Biological Diversity. Drawing on a range of information sources, including national reports, biodiversity indicators information, scientific literature, and a study assessing biodiversity scenarios for the future, the third edition of Global Biodiversity Outlook summarizes the latest data on status and trends of biodiversity and draws conclusions for the future strategy of the Convention.
http://gbo3.cbd.int/home.aspx

Global Carbon Atlas
The Global Carbon Atlas is a platform to explore and visualize data on carbon fluxes resulting from human activities and natural processes.

http://www.globalcarbonatlas.org/

Global Challenges
Earth Day Network offers a new curriculum called *Global Challenges, an Introductory Climate Change Curriculum* that provides four lesson plans suitable for middle school classrooms. The lesson plans are activity driven and work together to cover the broad topic of climate and climate change. These resources are available for free to members of the Teacher's Corner.
http://www.earthday.net/

Global Climate Change
The EPA has updated its website, A Student's Guide to Global Climate Change, devoted to educating 6-8th graders with the science, impacts to society and ecosystems, and solutions to climate change. The information is presented in videos, animations, interactive graphics, and expeditions where students can explore how climate change affects places around the world.
http://www.epa.gov/climatechange/kids/

Global Climate Change
This learning module from the Association of American Geographer's Center for Global Geography Education examines how climates have changed historically, and how the climate is currently being influenced by the activities of humans. Four case studies are included in the module, each focusing on a different region - Australia, The United States, Singapore, and Southeast Asia. Free registration is required for complete access to all the resources.
http://globalgeography.aag.org/GlobalClimateChange1e/index.html

Global Climate Change
NASA offers this new website, Global Climate Change, NASA's Eyes on the Earth. The site, managed by the Jet Propulsion Laboratory, is a one-stop-shop for all of the latest climate information from NASA's Earth-monitoring missions and research. The website offers background information, interactives, and much more. Categories include key indicators, uncertainties, solutions, and news.
http://climate.jpl.nasa.gov/

Global Climate Change
Global Climate Change, from the Exploratorium website, offers a window into the world of scientific research on climate change. Learn about physical processes underlying the earth's climate, data on how the climate is changing and the role of human activity, and questions and uncertainties that researchers continue to explore. The site is organized in five parts: the atmosphere, hydrosphere (oceans and water), cryosphere (snow and ice), biosphere (living organisms), and global effects.
http://www.exploratorium.edu/climate/index.html

Global Climate Change
Global Climate Change is produced by the Earth Science Communications Team at NASA's Jet Propulsion Laboratory/California Institute of Technology. The website offers well organized web pages covering key indicators and evidence, uncertainties, and much more. Check out the Cool Stuff, including 3D animations, surprising factoids, videos, and more.
http://climate.nasa.gov/

Global Climate Change: Economics, Science, and Policy
MIT's Sloan School of Management, through the OpenCourseWare initiative, offers materials for the course on climate change, including a syllabus, reading suggestions, lecture notes, and several assignments. The class introduces scientific, economic, and ecological issues underlying the threat of global climate change and the institutions engaged in negotiating an international response. Some of the reading materials are available on-line.
http://ocw.mit.edu/OcwWeb/Sloan-School-of-Management/15-023JSpring-2007/CourseHome/index.htm

Global Climate Change Education Resources
NASA's Challenger Center's Global Climate Change Education project offers five units for classroom teachers, grades 6-9, with a climate-focused event as seen through the lens of four of Earth's interconnected spheres: Lithosphere, Hydrosphere, Biosphere and Atmosphere. Other resources in the lesson plan database include Encounter Earth, Elementary Science, and more.
http://www.challenger.org/gcce/

Global Climate Change Impacts in the United States
The U.S. Global Change Research Program offers the downloadable report, *Global Climate Change Impacts in the United States*. In plain language, the report summarizes the science and the impacts of climate change on the United States, now and in the future. It focuses on climate change impacts in different regions of the U.S. and on various aspects of society and the economy such as energy, water, agriculture, and health.
http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts

Global Climate Change Online Teaching Resources
Vicki Osis has posted a compilation of teaching websites to teach climate change issues. It includes comprehensive websites as well as teaching activities that address specific issues of climate change such as impacts on coral reef, forests, and more. If the pdf does not open, download it to your computer, then open it.
http://members.peak.org/~laimons/climate_change/%20URLS2011.pdf

Global Change - Reading Ocean Fossils - Online
Sign up for the upcoming Smithsonian Science How webcast on ocean fossils and global changes, February12, 2015. The webcasts are archived, provide access to associated teaching resources, and are correlated to the NGSS.
https://qrius.si.edu/global-change-reading-ocean-fossils

Global Change Research Program
The U.S. Global Change Research Program coordinates and integrates federal research on changes in the global environment and their implications for society. The website includes links to regional and sectoral climate information, along with reports and other material. The downloadable scientific study, *Climate Change Impacts*, is written in plain language so that its findings are readily accessible. Check out the Resources section, and the Climate Change Wildlife and Wildlands Toolkit for educators.
http://www.globalchange.gov/

Global Education
Australia's Global Education emphasizes the unity and interdependence of human society, developing a sense of self and appreciation of cultural diversity, affirmation of social justice and human rights, as well as building peace and actions for a sustainable future in different times and places. The teaching resources include People and the environment, Sustainable energy resources, The power of a story, and much more.
http://www.globaleducation.edu.au/global-education/what-is-global-ed.html

Global, Environmental, and Outdoor Education Council Lesson Plans
The Global, Environmental, and Outdoor Education Council is one of 23 specialist councils of the Alberta, Canada Teachers' Association. They promote quality professional development for teachers. The website offers lesson plans covering a variety of subjects, for grades 1-9. Some of the topics include stewardship, endangered species, water, and more.
http://www.geoec.org/lessons/

Global Experiment of the International Year of Chemistry
Celebrate the 2011 International Year of Chemistry by participating in a global chemistry experiment open to K-12 students and teachers. Participants explore water quality issues through four activities (pH of the Planet, Salty Waters, Solar Still Challenge, and Water: No Dirt, No Germs), then share their experiment results with the global science community. Each activity includes a teachers' guide, a materials list, and more.
http://water.chemistry2011.org/web/iyc

Global Fever
Global Fever™ is a standards-based curriculum that addresses climate change in an age-appropriate manner for students ages 9 and above. The nine units are teacher-designed, and offer interdisciplinary activities which can be integrated into established curriculum.
http://www.globalfever.net/Global_Fever/Climate_Change_Curriculum.html

Global Forest Watch
The World Resources Institute hosts this dynamic forest monitoring and alert system. Global Forest Watch unites satellite technology, open data, and crowdsourcing to offer access to timely and reliable information about forests. The interactive map of the world includes features that allow users to learn about tree cover loss over time, success stories from around the world, and more. Visitors must agree to terms of use before accessing the website.
http://www.globalforestwatch.org/

Global Island Conservation Network
The Global Island Conservation Network listserve offers a network for the exchange of information useful to island conservationists. Subscribe at:
http://listserv.bgci.org/scripts/wa.exe?HOME

Global Map of Human Impacts to Marine Ecosystems
This analysis of human impacts to marine ecosystems, posted on the website for the National Center for Ecological Analysis and Synthesis, shows that over 40% of the world's oceans are heavily affected by human activities and few if any areas remain untouched. The goal of the research was to estimate and visualize the global impact humans are having on the ocean's ecosystems. While on the website, check out the link

to ***Kids Do Ecology***, an educational, participatory, bilingual website, supporting an inquiry-based approach to science for 5th grade classes to design and conduct scientific experiments in ecology.
http://www.nceas.ucsb.edu/GlobalMarine

Global Positioning System Guide
The NOAA Pacific Services Center offers an informational guide, Where Am *I Going? A Manager's Guide to GPS*. Meant for the coastal and marine resource management community, it provides a good introduction to the Global Positioning System (GPS), illustrates the benefits of GPS, and discusses considerations for purchasing GPS equipment.
http://www.csc.noaa.gov/psc/prodsvc.html

Global Reef Expedition
The Khaled bin Sultan's Living Oceans Foundation is on a ship-based 5-year Global Reef Expedition to map and assess fragile coral reef systems around the world. Check out the mission blog, multimedia, and more.
http://www.globalreefexpedition.org/

Global Schoolyard Bioblitz
Project Noah is teaming up with the National Environmental Education Foundation and National Geographic Education for the Global Schoolyard Bioblitz campaign. Teachers and students document the wildlife encountered in and around their school sites. The National Geographic website offers tools for any bioblitz, and students can upload their data to the Project Noah website. Be sure to check out the educator resources.
http://education.nationalgeographic.com/education/program/bioblitz/?ar_a=1&force_AR=True
http://www.projectnoah.org/missions/10164691

Global Systems Science
Global Systems Science is an integrated, interdisciplinary course for high school, consisting of nine student books, teacher guides, and software dealing with a societal issue that requires science for full understanding. Teacher guides are downloadable free online; student texts can be downloaded for review, but not printed. Texts are available on a number of different topics, including Climate Change, Losing Biodiversity, and Ecosystem Change, and can be used as a set or individually with other coursework.
http://www.lawrencehallofscience.org/gss

Global Ultraviolet Index
EPA and NOAA adopted a new Global Ultraviolet Index to help reduce overexposure to dangerous UV rays. The index, developed by the World Health Organization and other international organizations, replaces existing reporting methods. The index is designed to foster understanding of which precautions to take in protecting ourselves from different levels of UV radiation.
http://www.cpc.ncep.noaa.gov/products/stratosphere/uv_index/uv_current.html or http://www.epa.gov/sunwise/uvilaunch.html .

Global Warming Art
The goal of Global Warming Art is to make some of the data from the study of climate change accessible to the public, through a collection of figures and images that highlight and describe key issues necessary to understanding our world's changing climate.

Some of the categories currently available include Past Temperatures, Carbon Dioxide, Sea Level, Glaciers, and more. Individual images have descriptions and source information.
http://www.globalwarmingart.com/

Global Water Supply School Curriculum
Water.org launched school curriculum materials for World Water Day, March 22. Aligned with national standards, the lesson plans and mini-units include elementary, middle, and high school levels. Stand-alone lesson plans are part of larger units that cover a broad scope of subjects including English, science and technology, and social sciences like geography, civics and economics. Classroom activities cover everything from poetry seminars and vocabulary-building worksheets to science and math lessons.
http://water.org/lessonplan/

Global Warming
NASA's Earth Observatory features an article on global warming, explaining what global warming is, how scientists know it's happening, and how they predict future climate.
http://earthobservatory.nasa.gov/Library/GlobalWarmingUpdate/

Global Warming 101
The Will Steger Foundation is dedicated to creating programs that foster international leadership and cooperation through environmental education and policy. An on-line initiative, Global Warming 101, promotes change through education and advocacy, hoping to raise broad public awareness about global warming as witnessed through Will Steger's polar expeditions. The website includes educational information and materials, a discussion forum, and more.
http://www.globalwarming101.com/

Global Warming 101 Begins New Expedition
The Global Warming 101 expedition team of Inuit hunters, explorers, and educators, will embark on a four-month expedition to get a first-hand look at how global warming is impacting the Arctic landscape, wildlife, and human communities.
http://www.globalwarming101.com/content/view/32/88888907/

Global Warming 101 Expedition with Will Steger - Online
National Geographic Explorer Will Steger and a team of young adventurers from Norway, Great Britain, Canada, and the U.S. will bring their High Arctic dogsled expedition to educators and learners through multimedia dispatches. The website includes standards-linked multidisciplinary lesson plans appropriate for middle school and older students that explore how climate shapes the past, present, and future for members of the High Arctic community.
http://www.globalwarming101.com/

Global Warming Debate
The Online NewsHour Science Reports from PBS, funded by the National Science Foundation, discusses global warming, policy struggles to address it, international efforts, the cap-and-trade system, and more. The website offers interactive features, background information, a lesson plan, and more.
http://www.pbs.org/newshour/indepth_coverage/science/globalwarming/index.html

Global Warming Facts and Our Future
The Marian Koshland Science Museum explores the latest scientific information from the National Academy of Sciences about global warming. Learn about the greenhouse effect, the carbon cycle, and past changes in our climate. See predicted changes and how they could affect sea levels, agriculture, and ecosystems. The website also presents options for reducing CO2 emissions.
http://www.koshlandscience.org/exhibitgcc/index.jsp

Global Warming Frequently Asked Questions
NOAA's Climate.gov website recently posted this website with Frequently Asked Questions on Global Warming. The plain-language answers to commonly asked questions were vetted by a panel of climate scientists, and each answer is connected to references in the scientific literature. The article offers scientifically accurate responses to many of the myths and misconceptions about climate that circulate in emails or via social media.
http://www.climate.gov/news-features/understanding-climate/global-warming-frequently-asked-questions

Global Warming Survey
The Yale Project on Climate Change at Yale's School of Forestry & Environmental Studies has released the results of a new national survey on public responses to climate change.
http://environment.yale.edu/uploads/AmericansGlobalWarmingBeliefs2010.pdf

Global Warming: Understanding the Forecast
Global Warming: Understanding the Forecast is an introduction to global warming aimed at college-level non-science majors. The book examines the processes that control climate change and climate stability, from the distant past to the distant future. The website offers on-line interactive computer models which allow visitors to change the physics and chemistry behind the global warming forecast. Video lectures are posted on the website and are available for download to your computer for viewing.
http://geoflop.uchicago.edu/forecast/docs/index.html

Global Warming Web Resources
The National Association of Biology Teachers offers a number of instructional materials designed for use in the classroom along with grants, awards, and professional development opportunities. Their list of instructional materials includes a short listing of some global warming websites.
http://www.nabt.org/sites/S1/index.php?p=83

Global Water Experiment
Dow Chemical Company is supporting the Global Water Experiment, encouraging teachers and students to participate in a global experiment with students testing the water where they live and interacting with other students around the globe to share results. The results will be available on an interactive global data map throughout the experiment, which runs throughout 2011.
http://water.chemistry2011.org/web/iyc

Global Wildlife Disease News Map
The Global Wildlife Disease News Map displays news articles from the Wildlife Disease News Digest that have been posted within the last 45 days and have a geographical reference. On it, users can see wildlife disease headlines both locally and globally.
http://wildlifedisease.nbii.gov/wdinNewsDigestMap.jsp

Global Youth Service Day
Global Youth Service Day April 24-26, 2009, April 17-19, 2015 highlights and celebrates the difference youth make in their communities year-round through community service and service-learning.
http://www.gysd.org/

GLOBE Citizen Science Campaigns
Two GLOBE Citizen Science Campaigns include GLOBE at Night, an international citizen-science campaign to raise public awareness of the impact of light pollution, and GLOBE Student Climate Research Campaign, which aims to engage students in measuring, investigating, and understanding the climate system in their local communities and around the world.
http://www.smdeponews.org/programs-events/globe-phenology-and-climate-project-through-june-30/

GLOBE and Eco-Schools USA Collaboration
The National Wildlife Federation's Eco-Schools USA has partnered with The Global Learning and Observations to Benefit the Environment (GLOBE) Program to integrate school sustainability and earth systems observations, data collection, and action in an effort to protect and conserve wildlife and wild places. Learn about both programs and the benefits they can provide. Subscribe to newsletters, check out the wildlife pages, and more.
http://www.nwf.org/Eco-Schools-USA/GLOBE.aspx

GLOBE at Night Campaign
GLOBE at Night, February 25-March 8, 2008, is designed to aid teaching about the impact of artificial lighting on local environments and the ongoing loss of a dark night sky as a natural resource for much of the world's population. The website will include instruction guides, one-page flyers, and more.
http://www.globe.gov/GaN/

GLOBE at Night Campaign
Participate in GLOBE at Night, March 13-22 and April 11-20, a citizen-science campaign to raise awareness of the impact of light pollution by inviting citizen scientists to measure their night sky brightness and report their observations to a website from a computer or smart phone. The website includes activity packets, instructions, and more.
http://www.globeatnight.org/

GLOBE moves to Boulder, CO
The GLOBE Program now resides at the University Corporation for Atmospheric Research, in Boulder, Colorado. GLOBE is a worldwide hands-on, primary and secondary school-based education and science program. Internationally, GLOBE is a partnership between the United States and 100 other countries.
http://www.gsfc.nasa.gov/news-release/releases/2003/h03-087.htm

GLOBE Scientists' Blog
Read the Scientists' Blog to keep informed of timely topics in Earth Systems Science. Updated weekly, the blog is an online journal where GLOBE scientists post their thoughts, comments, and philosophies about a variety of science topics. The blog also provides students the opportunity to share comments and discuss topics with each other. The current topic is reporting on the recently released 2010 NOAA State of the Climate report.
http://blog.globe.gov/sciblog/

GLOBE Student Research Campaign on Climate Change 2011-2013
Planning for the GLOBE Student Research Campaign on Climate Change will begin in January 2009, and will enlist the support of climate change scientists, science educators and educational outreach experts, as well as businesses, foundations, and policy makers. The campaign will culminate with an international student research conference in 2013.
http://globe.gov/r/html/climatechange

GLOBIO - Mapping Human Impacts on the Biosphere
This UNEP program, Global Methodology for Mapping Human Impacts on the Biosphere (GLOBIO), uses models and analysis to assess human impact on the biosphere. The website features maps, videos, and documents, as well as a description of the model and scenarios. Analyses of coastal regions using the GLOBIO methodology are featured in the downloadable report, *Our Precious Coasts: Marine Pollution, Climate Change and Resilience of Coastal Ecosystems*.
http://www.globio.info/

Glogster EDU
Glogster allows users to create free interactive posters, called "glogs." Users insert text, images, photos, audio, videos, and other elements into their glogs to generate a multimedia online creation. Posters can be shared with other people and also exported and saved to computer-compatible formats. With Glogster EDU, teachers register their students and can create a safe, virtual class with as many as 200 students. Teaching glogs are private and are made accessible to others at the discretion of the teacher.
http://edu.glogster.com/

Glossopedia
Glossopedia is an online multimedia science encyclopedia that students can use to learn more about animals, habitats, science, technology, and more. Founded by a core team from the publishing, technology, business, and education communities, it is dedicated to offer safe and quality content that kids of all ages can enjoy.
http://www.globio.org/glossopedia/

Go Fish! Hawai'i and Great White Card Games
Educational, marine-themed card games, *Go Fish! Hawai'i* and *Great White,* have been received with minor errors, and are being made available at a special price ($2.50 each, plus shipping) to classroom teachers only, for distribution to their students. The minimum quantity is 24 decks and the maximum allowed is the number of students in their class. For more details, and if you have any other ideas about what might be done with these cards, please contact Elaine de Man at elainede@sbcglobal.net.
http://www.cardsharkpress.com/wst_page2.html

Go Green Commemorative Stamps
In celebration of Earth Day 2011, the United States Postal Service, in partnership with the United States Environmental Protection Agency, issued Go Green Forever stamps. The Go Green stamps show 16 simple actions we can take to conserve natural resources and promote the health of our environment.
http://www.usps.com/green/gogreenstamps.htm

Go Green Database
Edutopia offers the Go Green Database, an environmental-resources directory for educators. Users can search by topic, grade level, cost, or location. Topics include water, air/climate, habitat/ecosystem, and more, while resources can be searched for lesson plans, information/statistics, field trips, and more. Be sure to supplement the entries with your contributions and comments.
http://www.edutopia.org/go-green

Go Mobile with NOAA and NOS
Get ocean and coastal Information on the go; check out the current listings of ocean- and coast-related mobile websites and free applications produced by or in partnership with NOAA. Apps include marine debris tracking, WhaleALERT, phytoplankton identification, and more.
http://www.noaa.gov/mobile/
http://oceanservice.noaa.gov/mobile.html

Go Visit an Aquarium
The Bridge can help you find an aquarium or ocean science-related museum for your spring field trip or summer vacation. In the Resource Center section, you will find a listing of aquariums and ocean science museums. Studies show that many of students' most memorable and effective learning experiences occur outside the classroom, where they can see and touch marine science concepts first hand. The Bridge also features information on field trips to research institutions and other outdoor education centers.
http://www.marine-ed.org/bridge/index_aquarium.html

Goliath Grouper Video
A new video has been posted on You Tube titled Guasas bajo proteccion [goliath grouper under protection]. The video is a rough cut of what will be aired eventually on Telemundo. The audio is in Spanish, and they are working on subtitles or dubbing in English.
http://www.youtube.com/watch?v=FHRa26y-Ypk

Golden Gate National Parks BioBlitz, March 28 and 29, 2014!
The BioBlitz at California's Golden Gate National Parks will take place March 28-29, 2014. Experts can register to take part by January 31, 2014. School groups and the general public can receive updates and be notified about registration at a later date.
http://www.nationalgeographic.com/explorers/projects/bioblitz/golden-gate-california-2014/
http://ggnpc.convio.net/site/Survey?ACTION_REQUIRED=URI_ACTION_USER_REQUESTS&SURVEY_ID=13722

GoNorth!
This free K-12 online classroom expedition in the arctic sets out to explore the prospects of oil exploration, document the realities of Arctic climate change, and the value of

traditional ecological knowledge. Team GoNorth! will dogsled the land of Alaska to learn from the Gwiich'n and Inupiat Eskimo (Inuit) people along the trail while gathering scientific data from the field in collaboration with NASA and the Office of Polar Programs at National Science Foundation.
http://www.polarhusky.com/te2005.asp?menuID=121

Good Mate Program
Ocean Conservancy has launched the Good Mate program to encourage green boating in oceans and waterways. The website includes tips and information for boaters and marinas.
http://www.oceanconservancy.org/good-mate/

Good Thinking
Good Thinking is an animated series from the Smithsonian Science Education Center that explores topics in science, cognition, and pedagogy. The short videos address common student misconceptions with animated episodes specifically geared toward science educators.
http://www.ssec.si.edu/GoodThinking

Google Docs
Google Docs is an online word processor, spreadsheet, and presentation editor which enables users to securely create, store, and collaborate online in real time. Users can create documents from scratch or upload existing materials. Google offers this web page for educators, highlighting how students and teachers can use Google Docs in their work.
http://www.google.com/educators/p_docs.html

Google Earth
Google Earth combines satellite imagery, maps, and the power of Google Search to put the world's geographic information at your fingertips. The free download allows users to zoom into any part of the Earth. It brings across the point that approaching from space, one sees first the oceans, then land, and then coral reefs. Many of the world's large reef systems are clearly visible in low-resolution imagery from as close as about a virtual mile up, while some areas are available in higher resolution.
http://earth.google.com/

Google Earth Blog
The Google Earth Blog is dedicated to sharing the news, interesting sights, technology, and happenings for Google Earth.
http://www.gearthblog.com/index.html

Google Fusion Tables
Google Fusion Tables is a service for data management, integration, and collaboration. Users can upload data sets from CSV, KML, and spreadsheet files, merge data from multiple tables, and visualize the data using a variety of tools including Google Maps.
http://sites.google.com/site/fusiontablestalks/home

Google Map Maker
Google Map Maker allows users to add names and descriptions of areas in their community, map various features such as pedestrian trails, parks, and more.
http://www.google.com/mapmaker

Google Ocean Showcase
Google Ocean Showcase features multimedia tours of shipwrecks and underwater mountains, surf and dive spots, and more. The tours incorporate more than 1,000 images and video from a variety of sites and scientific organizations, and include underwater topographical maps, narration, and photos.
http://earth.google.com/ocean/showcase/

Google Public Alerts
Google's Public Alerts provide warnings for natural disasters and emergency situations. They appear based on targeted Google searches, or with location-based search queries. In addition to the alert, Google shows relevant response information, such as evacuation routes, crisis maps, or shelter locations.
http://www.google.org/crisisresponse/publicalerts/

Google Scholar - Free Search for Online Academic Documents
The Internet search organization Google has released a new tool called "Google Scholar" that allows you to look up any author, publication, or technical topic and find all of the other articles or websites that cite that work. Google Scholar enables you to search specifically for scholarly literature, including peer-reviewed papers, theses, books, preprints, abstracts, and technical reports from all broad areas of research.
http://scholar.google.com

Governor's Guide to Mass Evacuations
This guide was prepared to help governors and other state leaders prepare to play their roles in disaster response in advance of an emergency that involves mass evacuations. The guide covers important elements such as knowing the extent of authority, coordinating with nonprofits and volunteer organizations, establishing shelters, training, and reentry issues.
http://www.nga.org/files/live/sites/NGA/files/pdf/GovGuideMassEvacuation.pdf

GPA Marine Email Newsletter
The GPA is the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities, for which the United Nations Environment Programme (UNEP) provides the secretariat. Monthly GPA Outreach newsletters and weekly GPA News Updates are a new source of information about related events and information relevant to the wider marine and freshwater sector. To subscribe to GPA Outreach, send an e-mail to join-gpa-outreach@lists.healthdev.org .

GPA Outreach Online Debate
The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA) hosted an interactive online debate as part of GPA Outreach, March 8-17, 2004. The debate focused on *Water Management and Governance* and *Perspectives on Water and Poverty Reduction*.
http://www.unedforum.org/debate/ .

GPS Lesson
NOAA offers the lesson plan, I Know Where You Are! for students in grades 9-12 that introduces the basic principles of a Global Positioning System (GPS) and provides practice opportunities in locating specific features on a topographic map. The lesson

plan includes extensions, background information, resources, learning procedures, student worksheets, and more.
http://oceanservice.noaa.gov/education/lessons/where_you_are.html

Graduate Students for Ocean Education
COSEE Ocean, one of three new COSEE Centers, has launched Graduate students for Ocean Education (GrOE), a Facebook page intended to be a hub of information for graduate students in oceanography and related fields who are also interested in education and outreach. It includes announcements about jobs, fellowships, research opportunities, and more.
http://www.facebook.com/COSEEGrOE

Graduation Pledge of Social and Environmental Responsibility
The Graduation Pledge of Social and Environmental Responsibility states, "I pledge to explore and take into account the social and environmental consequences of any job I consider and will try to improve these aspects of any organizations for which I work." Students at over a hundred colleges and universities, ranging in size from Whitman to Harvard, have used the pledge at some level.
http://www.graduationpledge.org/ .

Grand Bay National Estuarine Research Reserve
Mississippi Department of Marine Resources' Grand Bay National Estuarine Research Reserve (NERR) offers this site for educators, researchers, students, and others. This website features several sections of interest including a short video showing the reserve before and after Hurricane Katrina and a species profile generator. The website includes downloadable field journals, books for students, slide shows, and more.
http://www.grandbaynerr.org

Grand Challenges for Engineering
An international group of leading technological thinkers were asked to identify the Grand Challenges for Engineering in the 21st Century. The National Academy of Engineering Committee on Engineering's Grand Challenges has identified 14 areas, including develop carbon sequestration methods, provide access to clean water, and more. Check out the challenges, the Scholars Program, K-12 Partners Program, and more.
http://www.engineeringchallenges.org/

Grand Time Game
The Grand Time Game is a collection of activities that teach students about geologic time. The game elements consist of a tabletop model that demonstrates the geologic history of the Grand Canyon, a script in which students report selected events along the geologic time scale as the instructor operates the model, and a set of overhead transparencies that the instructor shows to illustrate the story.
http://fsc.fernbank.edu/Geology/GEOWEB/GrandTimeGame/GrandTimeGame.html

Gratitude and the Environment
This site from PBS Learning Media outlines a lesson plan (grades 5-8) concerning gratitude for the earth's diverse ecologies. In addition to the lesson plan, the web page offers links to media resources, educational standards, and more. Be sure to check out the Transformative Teachers link.
http://www.pbslearningmedia.org/resource/transt.pd.lpgratitude/gratitude-and-the-environment/

Graveyard of the Pacific: The Shipwrecks of Vancouver Island
The Virtual Museum of Canada explores the various shipwrecks that have taken place around Vancouver Island, off the mainland of British Columbia, from the year 1803 to the present day. Read tales of survival from these vessels, view an interactive map of the shipwrecks, and learn about the various hazards associated with the waters off Vancouver Island. Check out the interactive game called "Wrecks."
http://www.pacificshipwrecks.ca/english/index.html

Gray's Reef Brought to Atlanta Through Distance Learning
Through Georgia's distance learning program, Gray's Reef National Marine Sanctuary educators teach and interact live with typically three and as many as seven classes across the state and nation simultaneously. With slides and video footage, they bring Gray's Reef to students from downtown Atlanta and the peanut farming communities of Plains to the mountains of New York and desert of Arizona.
http://www.graysreef.nos.noaa.gov/education.html

Gray's Reef Expedition
Join NOAA's Gray's Reef National Marine Sanctuary as scientists and crew conduct a research mission aboard the NOAA ship *Nancy Foster,* May 18-June 8, 2010. Read the blogs, watch video, and more from this website. Investigations include tagging and tracking of reef fish, habitat mapping, invertebrate studies, marine debris and CO_2 monitoring, and fish predation behaviors
http://sanctuaries.noaa.gov/missions/2010nancy_foster/welcome.html

Gray's Reef Expedition 2012
Scientists, staff, and volunteers will conduct a research mission within Gray's Reef National Marine Sanctuary aboard the NOAA Ship *Nancy Foster,* May 28-June 8, 2012. Scientists will concentrate on three research projects: fish censuses, invertebrate density and abundance, and multibeam mapping. Follow along with blogs, interviews, and more.
http://graysreef.noaa.gov/science/expeditions/2012_nancy_foster2/welcome.html

Gray's Reef National Marine Sanctuary Ocean Film Festival
The Gray's Reef National Marine Sanctuary will host the 2007 Ocean Film Festival September 21-23, 2007 in Savannah, Georgia. The films explore the beauty of the sea, the complexity of the marine ecosystem, the creatures that inhabit it, our maritime heritage, and humankind's relationship with the oceans in a family-oriented format. The festival is free.
http://www.graysreefoceanfilmfestival.com/

Gray's Reef Ocean Film Festival
Attend the Gray's Reef Ocean Film Festival, September 23-25, 2005 in Savannah and Tybee Island, Georgia. More than 20 free films about the ocean will be shown, sponsored by Gray's Reef National Marine Sanctuary and the National Marine Sanctuary Foundation. All films are free; tickets will be available at the Trustees Theater box office (912 525 5050) starting September 1, 2005. For more information, call (912) 598-2345.
www.graysreef.noaa.gov

Great American Adaptation Road Trip
Two post-grads spent three months in the summer of 2013 traveling around the United States with a goal to document on-the-ground examples of climate resilience, setting out to answer the question, What does climate change adaptation look like? Follow along with these stories of people and places adapting to the impacts of climate change.
http://adaptationstories.com

Great Annual Fish Count
The event registration and planning for the upcoming Great Annual Fish Count has begun. 2006 marks the 15th year for this annual marine conservation citizen science event. All events must be registered online in order to guarantee inclusion on the website calendar, media releases, and other publicity. All Fish ID classes must be offered free. The website includes inclusive information for organizers, links to learning resources, a fundraising challenge, and more.
http://www.fishcount.org/index.html

Great Annual Fish Count
The Great Annual Fish Count is held each July to introduce divers and snorkelers to the hobby of fishwatching; to help researchers by surveying fish populations and recording which fish are seen; and to educate the public about our marine resources. Events are held around the country. Check the fishcount website for locations, learning resources, and more.

Join scientists in New England on July 28, 2012 for a count sponsored by REEF and the New England Aquarium Dive Club. There are numerous sites to choose from, but you must sign up for a free REEF membership and a dive site in advance so they can record your fish sightings. To learn more about identifying local fish species and the surveys, volunteers can attend the New England Aquarium Dive Club meeting June 20, 2012 on New England Fish ID and REEF surveys.
http://www.neadc.org/gafc/
http://fishcount.org/

Great Backyard Bird Count
The National Audubon Society and the Cornell Laboratory of Ornithology encourage everyone to count birds with a buddy for the ninth annual Great Backyard Bird Count, February 17-20, 2006. February 14-17, 2014. The Mississippi Classroom Activity Kit can help you bring the birds into your classroom at http://www.msaudubon.org/GBBC/classroom.php. Count in a backyard, on a high-rise balcony, in a park, or on any of the 730 million acres of public lands. If you have iTunes, check out the free Merlin Bird ID app.
http://www.birdsource.org/gbbc/
http://merlin.allaboutbirds.org/

Great Belt Research Cruise
Join scientists from seven marine labs and universities as they study phytoplankton in the South Atlantic. Researchers will investigate the effects of ocean acidification on the Southern Hemisphere's largest recurring phytoplankton bloom, known as the Great Southern Coccolithophore Belt. Learn about current ocean science research, ocean acidification, tools oceanographers use, life at sea and, and more. The website includes information about the cruise, ship data, photos, educational materials, and more.
http://greatbeltresearchcruise.com/

Great Explorations in Math and Science
Great Explorations in Math and Science (GEMS) offers specialized professional development workshops, an international support network, and science and math curriculum for teachers of grades pre-K thru 8. They have teacher's guides, a series of home activity kits, online activities and videos, an email newsletter, and more in a broad range of earth and ocean science related science units, including *On Sandy Shores, Only One Ocean*, and *Ocean Currents*. GEMS is also introducing a line of integrated science and literacy curricula entitled *Seeds of Science/Roots of Reading* which will launch Fall 2007 with the title *Shoreline Science*.
http://www.lhsgems.org/
http://seedsofscience.org/

Great Lakes Areas of Concern Program
This website, from the Great Lakes Commission under a grant from the EPA, provides a variety of information on the Great Lakes Areas of Concern program and associated Remedial Action Plans, highlighting actions taken to identify and clean up polluted areas in the Great Lakes.
http://www.glc.org/rap/resources/

Great Lakes BeachCast
The Great Lakes Information Network developed this website with funding from the EA in an effort to provide better beach information to the Great Lakes community. It will broadcast information about beach closings and educational content on human health concerns. The website provides news about erosion control projects, contamination and cleanup efforts, beach testing efforts, and more. There are also links to monitoring data.
http://www.great-lakes.net/beachcast/index.html

Great Lakes Climate Change Curriculum
Ohio Sea Grant has developed a set of climate change lessons for the Great Lakes region. These activities provide information for teachers and the printable resources needed to use them. The curriculum are meant to help middle and high school students draw connections between global climate change and what's happening in their own neighborhoods. Curriculum topics include Learning with Google Earth, Climate Change and Aquatic Invaders, and more.
http://climategreatlakes.com/tag/great-lakes-climate-change-curriculum/

Great Lakes Climate Change Science and Education Systemic Network
The Climate Change Education Partnership is creating an online community and resource database for climate change research and education in the Great Lakes region. Be sure to add your programs.
http://www.coexploration.org/greatlakesclimatechange/index.html

Great Lakes Eco-Region
NOAA's Great Lakes Eco-Region learning resources include multimedia, lessons, links to real-world data, and background information about these bodies of water. Lessons and background information cover fish life cycles, watershed land use, invasives, and more. The website also offers links to many other Great Lakes resources.
http://www.education.noaa.gov/Freshwater/Great_Lakes_Eco-Region.html

Great Lakes Ice
For the past 30 years, NOAA has been recording ice data in Great Lakes. Researchers at the NOAA Great Lakes Environmental Research Laboratory in Ann Arbor, Michigan, have tracked ice cover in this region searching for signs of climate change and gathering data to help them better understand ice and its impacts on the Great Lakes and other regions of the world. Students will enjoy the animations, while teachers will appreciate the background information and data.
http://www.magazine.noaa.gov/stories/mag172.htm

Great Lakes Ice Page
The Great Lakes Environmental Research Laboratory hosts the Great Lakes Ice Page regarding Great Lakes ice cover with ice products, data, research papers, images, statistics, and more.
http://www.glerl.noaa.gov/data/ice/

Great Lakes Invasive Species Information, Activities, and Curriculum Guide
Illinois-Indiana Sea Grant provides a wealth of Great Lakes environmental education on their website, with a focus on invasive species. The Biological Resources page links to aquatic invasives activities and resources, while Water Quality links to many useful classroom resources and information. Down-load *The Great Lakes Invasive Species Curriculum Guide* to provide students an introduction to aquatic invasive species.
http://www.iisgcp.org/edu/br/grlksinv.pdf. http://www.iisgcp.org/edu/ .

Great Lakes Literacy Principles
The Great Lakes Literacy Principles Website is being developed so that instructional materials, as well as links to Great Lakes and ocean information, will be readily available to the Great Lakes audience. Educators in the Great Lakes use the framework to encourage more Great Lakes content in curricula and to focus state agency efforts toward education that is recognized for relevance to Great Lakes science. The website offers the literacy principles, downloadable lessons and activities, and more.
http://greatlakesliteracy.net/

Great Migrations
National Geographic Channel's Great Migrations is a seven-part global programming event that takes viewers on the journeys millions of animals undertake to ensure the survival of their species. The National Geographic Channel supported the development of education resources downloadable from this website to help bring content about animal migration and behavior into the classroom. The series will start November, 2010, but videos are already available on the website for previewing.
http://www.nationalgeographic.com/great-migrations-educator-resources/

Great Lakes in My World Curriculums
The Great Lakes in My World curriculums were developed to instill a sense of place; provide a positive focus and be inquiry-based; promote problem-solving and learning for understanding; and offer service learning. Two documents are available, for K-8 and 9-12, and include indoor and outdoor activities.
http://www.greatlakes.org/glimw

Great Lakes Shipwreck Bibliography
The Great Lakes hold an unknown quantity of historic archaeological sites, including shipwrecks. These shipwrecks are part of the maritime history of the United States, and

many are in cultural marine protected areas. A list of publications on the shipwrecks in and around Michigan and Lake Superior is currently available in the MPA Virtual Library (use the search engine, keyword: shipwreck). The library has a preliminary bibliography of maritime archaeological and historical publications held in the Library of Michigan and the Office of the State Archaeologist, Michigan Historical Center; direct access to this abstract is at http://www2.mpa.gov/mpa/mpaservices/library/Action.Lasso?-database=mpalib&-layout=tableview&-response=mpadisplay.lasso&-recordID=36900&-search .

> Halsey, John R., 2003, *A preliminary bibliography of maritime archaeological and historical publications held in the Library of Michigan and the Office of the State Archaeologist, Michigan Historical Center*, Lansing, MI

Great Lakes White Hurricane of November 1913
Check out these resources about the Great Lakes hurricane of November 1913. The weather forecast article is a good introduction, while the Centennial website links to an overview presentation, models, and more.
http://www.crh.noaa.gov/dtx/stm_1913.php
http://www.regions.noaa.gov/great-lakes/centennial_anniversary_storm_of_1913/

The Great Nature Project
National Geographic will launch The Great Nature Project, a week-long celebration of biodiversity. From September 21-29, 2013, participants take pictures of plants and animals in their neighborhood and upload them to a Great Nature Project website. Sign up for news and updates.
https://docs.google.com/a/ngs.org/spreadsheet/viewform?fromEmail=true&formkey=dDlMZXBjVGR1SWIwYzdnNGp5WTFzdWc6MQ

Great Science for Girls
Funded by the National Science Foundation, Great Science for Girls has seven programs operated by intermediary organizations to provide informal opportunities for elementary to high school grade girls to explore science. The website offers sample activities, links to other resources, and more.
http://www.greatscienceforgirls.org/

Great Southern Coccolithophore Belt Expedition
Follow this team of international researchers as they conduct fieldwork in the Southern Ocean, February 18-March 23, 2012. Scientists are investigating a phytoplankton feature known as the Great Southern Coccolithophore Belt, an area with an unusually high population of a type of calcifying phytoplankton. The belt stretches around the entire Southern Hemisphere.
http://greatbeltresearchcruise.com/

Great Turtle Race
Eleven critically endangered leatherback turtles were tagged with a satellite tracking device, and followed through the Great Turtle Race from a Costa Rican beach across the Pacific towards the Galapagos Islands. This public awareness and educational campaign was sponsored by three schools—an elementary school, a high school and a university. Teachers can use the curriculum and background information provided on this website and/or create their own lesson plans around the event.
http://www.greatturtlerace.com/

The Great Warming
Narrated by Alanis Morissette and Keanu Reeves, *The Great Warming* is a film about climate change which reveals how a changing climate affects the lives of people in a variety of places around the world. The website includes a trailer, links to books, and background information.
http://www.thegreatwarming.com

Great Whales Curricula
Oregon State University's Marine Mammal Institute offers The Great Whales curricula for grades 6-9. The materials address research efforts to expand our knowledge about marine mammals and explore whale biology, ecology topics, and more. The nominal cost covers shipping and handling.
Contact Vicki Osis at vjosis@peak.org

Great Whales Curriculum
The Great Whales Curriculum, developed by the Marine Mammal Institute at Oregon State University, is now available for downloading in pdf format. The curriculum is geared for grades 6-9.
http://mmi.oregonstate.edu/outreach

Greedy Goblins' Global Warming
Join the folks at Dauphin Island Sea Lab for a spooky evening of kid-friendly games, activities and education as you learn how to battle the warming forces of the Greedy Goblins, October 26, 2007 in Dauphin Island, Alabama. Games for children of all ages will be held and admission to the event is free. Exhibits, games, and contests will be designed to teach visitors about the causes and effects of global warming, and what we can do to combat those effects to be good stewards of our environment.
For more information on Spooktacular, call 251-861-8710

Green Careers Resource Guide
The Green Careers Resource Guide is designed to assist career development professionals, but is also of use to self-directed students, career explorers, job seekers, and career changers.
http://www.cassio.com/FreeResourceGuides.htm

Green Conference Guide from EECOM
From the Canadian Network for Environmental Education and Communication (EECOM), this online guide can help make your next conference or meeting greener.
http://www.eecom.org/english/greenconf.html .

Green Economy in a Blue World
The report from the United Nations Environment Programme (UNEP), Green Economy in a Blue World, analyzes how key sectors that are interlinked with the marine and coastal environment can make the transition towards a green economy, covering the impacts and opportunities linked with shipping and fisheries to tourism, marine-based renewable energies, and agriculture.
http://www.unep.org/pdf/green_economy_blue.pdf

Green Education Foundation Institute Virtual Classroom
The Green Education Foundation's GEF Institute is a virtual classroom offering courses in sustainability to educators, high school and undergraduate students, and professionals. Each 15-hour course is self-paced over a 90-day period. Each 30-hour course includes access to lessons, audits, PowerPoints, and videos. Companion curriculum packs include 10-15 scripted lessons and a hands-on audit.
http://www.greeneducationfoundation.org/institute

Green Fins
The Green Fins program encourages dive centers and snorkel operators in Indonesia, Malaysia, and elsewhere to work together to reduce their environmental impacts on coral reefs by adopting the Green Fins Code of Conduct. The code consists of 15 points which target environmental threats posed by the diving and snorkeling industry, both under the water and in shop. Members receive the training and the tools to promote environmental education and awareness.
http://www.greenfins.net/

Green Guide to the Mexican Caribbean
Mexiconservación launched the Green Guide to the Mexican Caribbean, a manual available in English and Spanish designed to educate both individuals and businesses as to the value of the region's biodiversity and the threats it faces. The downloadable guide includes conservation guidelines relating to sea turtles, coral reefs, mangroves, seagrasses, cenotes, lagoons and beaches. It offers good practices recommendations for sport fishing, recreational boating, and hotel and restaurant management.
http://www.mexiconservacion.org/MC_GreenGuide.html

Green Machines
This video from NASA introduces phytoplankton - the base of the marine food web, the source of half of the oxygen on Earth, and an important remover of CO_2 from the atmosphere. The video reviews how satellites are used to monitor phytoplankton and how warming waters and acidification negatively affect phytoplankton.
http://cleanet.org/resources/43137.html

Green Media Toolshed
Green Media Toolshed is a nonprofit organization that works with the environmental community to provide online media and communications tools. Tools include an online media database, email and fax outreach abilities, and tips to help groups build relationships with reporters. Other assets include photos that members can use, a fully branded online press room, and more. Yearly membership fees are a sliding scale based on budget and scope of outreach.
http://www.greenmediatoolshed.org/aboutus/goalsandstratigies.acs

Green Planet Stream
Green Planet Stream from Green Planet Films offers a portal to streaming nature and environmental films. Film topics include ocean conservation, sustainable fishing, endangered wildlife, and more. Trailers can be viewed for free.
http://greenplanetstream.org/

Green Schools Webinar Series
The National Environmental Education Foundation and partners offer a series of three free webinars to help educators learn how to green their schools and curriculum. See the website for times and registration information.
http://www.classroomearth.org/gswebinars

Green Schoolyards America
Green Schoolyards America supports the green schoolyard movement. Their mission is to enable communities across the United States to enrich their school grounds and use them to improve children's well-being, learning, and play while promoting community engagement and contributing to the ecological health and resilience of cities. Download the free activity guide, check out the publications, and more.
http://www.greenschoolyardsamerica.org/

Green Strides Website
This website from the U.S. Department of Education showcases free resources that schools can use to meet the criteria for its Green Ribbon Schools award program or simply use to help green their operations. Check out links to Nature Explore, NOAA's Ocean Guardian School, and more under the Resources tab.
http://www.greenstrides.org/

Green Teacher Webinars
The free Green Teacher webinar series has resumed for 2012. Upcoming topics include climate change education, March 8, 2012, and schoolyards re-imagined, March 27, 2012.
http://www.greenteacher.com/webinars.html

Green Team America
The mission of Green Team America is to organize, educate, and motivate America's youth about the effects of man-made climate change and to provide an infrastructure that allows students to combine their individual and local efforts with a nationwide movement.
http://americasgreenteam.org/

Green TV
Green TV, from UNEP, is the world's first broadband TV channel dedicated to environmental issues. Covering everything from climate change to children's stories on wildlife, it will carry films from around the world. It will have seven channels covering: air, land, water, climate change, people, species and technologies. Each channel will include a feature, a news item, and a children's story.
http://www.green.tv/

Greenhouse Gas Equivalencies Calculator
The greenhouse gas equivalency calculator can help us understand just what reducing carbon dioxide emissions by 1 million metric tons means in everyday terms. This equivalency calculator may be useful in communicating your greenhouse gas reduction strategy, reduction targets, or other initiatives aimed at reducing greenhouse gas emissions.
http://www.epa.gov/cleanenergy/energy-resources/calculator.html

Greening of the Great Lakes
Michigan State University and Detroit's radio station WJR offer this website as an online resource for those interested in learning about the Great Lakes region, related environmental issues, and ways that they can protect the environment.
http://www.greeningofthegreatlakes.com/

Greening STEM Planning Toolkits
This five-volume set of planning toolkits is being offered free to educators in honor of this year's EE week theme, *Greening STEM: The Environment as Inspiration for 21st Century Learning*. The toolkits feature STEM activities and resources for all grade levels on Gardens & Schoolyards, Energy Efficiency, Geography Connections, Water Resources, and Climate & Weather. The kits highlight opportunities for project-based learning, service-learning, and citizen science.
http://eeweek.org/greening_stem/toolkits

Groundwater Animations
Carleton College offers this website with computer animations related to groundwater. They contrast the permeability of gravel, sand, silt, and clay, as well as the speed of groundwater movement in rivers, lakes, and aquifers. Animations also outline the hydrologic cycle, exhibit groundwater overdraft, and show how groundwater can erupt as a geyser. While on the website, check out the rest of the visualizations collection.
http://serc.carleton.edu/NAGTWorkshops/visualization/collections/groundwater.html

Groundwater Educational Flash Animation
This short flash video stars two singing groundhogs and offers a cute overview of groundwater.
http://www.leapingmedia.com/groundwater.html

Groundwater Story
This online groundwater animation was produced by Leaping Media through Seattle Public Schools and in coordination with King County's Groundwater Protection Program.
http://www.kingcounty.gov/environment/waterandland/groundwater/education/animation.aspx

Grouper Moon Project
Watch live-feed or archived webcasts of the Little Cayman Nassau Grouper spawning aggregation. Live broadcasts will be held February 6, 9, and 11, 2015.
http://www.reef.org/node/10098#node-10099

Growing Up WILD
Growing Up WILD is an early childhood education program that builds on children's sense of wonder about nature and invites them to explore wildlife and the world around them. Tthe program provides an early foundation for developing positive impressions about the natural world and lifelong social and academic skills. Guides are distributed to participants at professional development workshops, offered by Project WILD state coordinators. The website offers the downloadable activity, Fishing Fun!
http://www.projectwild.org/GrowingUpWILD.htm

The Guardian's Science Weekly Podcast
The Guardian's Science Weekly podcast and the extensive archive touch on a myriad of science topics including climate change, controversies, and more.

http://www.guardian.co.uk/science/series/science

Guide to Building Effective Education Initiatives
The SAI (STEM Accelerator Initiative) Guide to Building Effective STEM Education Programs is available from the National Alliance of State Science and Mathematics Coalitions. The guide can be a useful resource for anyone designing a new education program or conducting a strategic review of an existing program.
http://www.dehavillandassociates.com/SAIGuide_NASSMC.pdf

Guide to the Decapod Crustaceans of the South Pacific
CRISP, Coral Reef InitiativeS for the Pacific, has released a field guide which is downloadable online, *A guide to the decapod crustaceans of the South Pacific.* The guide includes photos, informative text, and a section of general information on crustaceans at the beginning of the book. The book covers reef, shore, mangrove, stream, and terrestrial species.
http://www.crisponline.net/CRISPProductNew/Biodiversityknowledgeandconservationplanning/tabid/317/Default.aspx

Guide to the Exotic Species of San Francisco Bay
The bays and estuaries of the Pacific Coast contain some of the most invaded marine habitats in the world, with additional species arriving every year. The Species Gallery of this guide to the exotic species of San Francisco Bay helps you identify and learn more about some of the most common invaders in this area. Clicking on an image in the gallery takes you to a web page with information about the species, native range, distribution, and more.
http://www.exoticsguide.org/

Guide to Good Environmental Management Practices for Marinas in Mexico
The Guide to Good Environmental Management Practices for Marinas in Mexico is the result of an open collaboration among a diverse group of people, organizations, and institutions who are committed to the idea that environmental protection is a key function of marina operations. This initiative identifies and supports the voluntary adoption of good marina management practices through preparing codes of conduct, technical manuals, pilot projects, and training. The guidelines are in English and Spanish.
http://www.crc.uri.edu/mxgmp/

Guide to Implementing the Next Generation Science Standards
The Framework for K–12 Science Education and the Next Generation Science Standards (NGSS) describes a vision for science learning and teaching. This report includes seven principles to guide the implementation of the vision of the framework, and provides recommendations in the areas of instruction; professional learning for teachers and district leaders; curriculum resources; policies and communication; collaboration, networks and partnerships; and assessment.
http://www.nap.edu/openbook.php?record_id=18802

Guide to Our Oceans
The Nature Conservancy Magazine's Winter 2010 issue offers this online introductory Guide to Our Oceans. The website offers additional links for more in-depth information about each topic. Archives of past issues of the Nature Conservancy Magazine include features on Fish and Tradition, coral, mangroves, fire, and much more.
http://www.nature.org/magazine/winter2010/features/art32763.html

Guide to Responsible Travel Options in the Americas
The Rainforest Alliance and their partners have produced a user-friendly guide to help you select reputable hotels and tour operators practicing sustainable tourism principles. The Sustainable Tourism Certification Network of the Americas offers *Certified Tourism Products in the Americas* with descriptions of 138 hotels, restaurants and other types of tourism businesses in Guatemala, Costa Rica, Ecuador and the Caribbean.
http://www.rainforest-alliance.org/news/2005/travel_guide.html

Guided Discovery Problems
The Science Education Research Center at Carleton College has worked with a team of colleagues to create a series of Guided Discovery Problems with materials to help students learn about the world of geology through puzzles, hands-on activities, leading questions, and hints. Problems include Density, Buoyancy and Convection, Seasons and Why the Equator is Warmer than the Poles, and more.
http://serc.carleton.edu/sp/library/guided_discovery/index.html

Guides to the Species of the ACE Basin, South Carolina, and Coastal Habitats of Rhode Island
The Ashepoo-Combahee-Edisto (ACE) Basin of South Carolina has a largely undeveloped landscape with diverse habitats, with more than 1500 different plant and animal species that interact with the physical environment to create the ACE Basin ecosystem. The Internet-based Species Gallery highlights birds, fish, invertebrates, mammals, plants, and reptiles that make their home in the ACE Basin.
http://www.dnr.state.sc.us/marine/mrri/acechar/specgal/birds.htm .

Rhode Island is home to an array of coastal habitats, including salt marshes, seagrass beds, and river systems which contribute greatly to the state's biological integrity and diversity and help support the state's economy. Rhode Island's Habitat Restoration Portal hosts an Internet-based Species Gallery of anadromous fish, seagrass, and salt marsh habitats highlighting invertebrates, birds, fish, and plants found there.
http://www.edc.uri.edu/restoration/html/gallery/seagrass.htm

Guide to Understanding a Sense of Place
The free *Guide to Understanding a Sense of Place* (publication number EPA 842-B-01-003) explores the concepts of community and culture and provides tools for identifying, assessing, and working cooperatively within the social dynamics and local values connected to environmental protection. The guide is designed for people involved in community-based initiatives.
http://www.epa.gov/ncepihom/index.htm

Guidelines to Prevent Species from becoming Endangered or Threatened
This 56-page draft guideline was produced for a consortium of NGOs, bringing together current international and small island conservation planning information which can be used by national planners to build a pro-active plan for protecting island species and habitats from current and projected hazards and threats. It is available for downloading under Information Documents on the website. Check out the many other useful documents on the SPAW COP IV website.
http://cep.unep.org/meetings/2006/spaw-cop-iv/meeting_documents_view

Gulf Facts
Visit the Gulf of Mexico Foundation website for information about the Gulf of Mexico. Representing a wide range of interests (agriculture, business, fisheries, industry, tourism, and the environment), the Foundation promotes and funds research, education, and conservation programs. The focus area encompasses all areas bordering the Gulf. The website covers geography, resources, history, environmental concerns, education, and more.
http://gulfmex.org/facts.htm .

Gulf of Alaska with NOAA Ocean Exploration
The Gulf of Alaska 2004 Expedition from NOAA's Ocean Exploration, July 30-August 23, 2004, explored five large seamounts located approximately 200 miles off the Alaska coast. Scientists will focus their investigations on seafloor aging and characterization, deep-sea coral genetics, and community ecology. The website hosts essays and lesson plans that tie directly to the expedition, developed for students in Grades 5-12. Logs, Ask an Explorer, videos, and more were added during the expedition.
http://oceanexplorer.noaa.gov/explorations/04alaska/welcome.html .

Gulf and Caribbean Research Journal
Gulf and Caribbean Research is a peer-reviewed, scientific journal published online by The University of Southern Mississippi. The journal considers manuscripts which deal mainly with research or research issues pertinent to the Gulf of Mexico and Caribbean Sea.
http://aquila.usm.edu/gcr/

Gulf of Maine Primer of Marine Habitat Types
The Gulf of Maine Council on the Marine Environment has recently released The Gulf of Maine Primer of Marine Habitat Types, which details the types of habitats found in the Gulf of Maine region. The primer provides scientific data and descriptive characterizations to assist with evaluating and safeguarding marine habitats.
http://www.gulfofmaine.org/habitatprimer/

Gulf of Maine Monitor
Access cutting edge research and issues about coastal ocean observing in the Gulf of Maine by subscribing to the *Gulf of Maine Monitor*. Each issue explores timely issues surrounding the western Gulf of Maine, such as the effects of spring storms on the spring bloom. The Monitor is published quarterly and is free of charge.
http://www.cooa.unh.edu/publications.jsp

Gulf of Maine Research Institute
The Gulf of Maine Research Institute website offers materials to teach and learn about aquatic environments. Topics range from how satellites image the Earth to detailed examinations of species and habitats including lobsters, turtles, herring, marine mammals, and aquatic environments from Katahdin to the sea. They currently focus on developing science learning opportunities for middle school students complemented by professional development programs for teachers.
http://www.gmri.org/education/index.asp

Gulf of Mexico Alliance
The Gulf of Mexico Alliance, a partnership between Alabama, Florida, Louisiana, Mississippi and Texas, is intent on increasing regional collaboration to enhance the

ecological and economic health of the Gulf of Mexico. Current focus is on five issues: water quality for healthy beaches and shellfish beds; wetland and coastal conservation and restoration; environmental education; identification and characterization of Gulf habitats; and reductions in nutrient inputs to coastal ecosystems.
http://www.dep.state.fl.us/gulf/default.htm

Gulf of Mexico Alliance Environmental Education Network Clearinghouse
The U.S. Geological Survey, National Wetlands Research Center in Lafayette, Louisiana, offers the Gulf of Mexico Alliance Environmental Education Network Clearinghouse. The site is searchable by issue and state. Information is included on reducing nutrient inputs, restoration, water quality, habitats, and much more. Check out the image galleries and links to science careers.
http://www.nbii.gov/gomaeen

Gulf of Mexico Curriculum
The Deep-C Consortium offers this Gulf of Mexico Curriculum, Deep Sea to Coast Connectivity: Utilizing scientific research to help students make connections between the theoretical nature of science and real world applications. The multidisciplinary curriculum was developed around five main research areas: geomorphology, geochemistry, ecology, physical oceanography, and modeling.
http://deep-c.org/education-and-outreach/gom-curriculum

Gulf of Mexico Data Atlas
NOAA offers this new Gulf of Mexico Data Atlas, which is based on the idea of a traditional atlas but offered online. The atlas includes information about the physical environment, marine resources, and economic activity in the Gulf of Mexico. This initial release of the offers 95 map plates in 31 different subject areas; more will be released in 2012.
http://gulfatlas.noaa.gov/

Gulf of Mexico Educator Resources
The Gulf of Mexico Alliance Environmental Education Network features lessons, data, maps, and media resources related to the science of the Gulf of Mexico. The resources are organized by topic or grade level and include data, maps, media and more.
http://www.gulfallianceeducation.org/educator_resources.php

Gulf of Mexico 2012 Expedition
Follow along with NOAA's Office of Ocean Exploration and Research on the Okeanos Explorer Gulf of Mexico 2012 Expedition, March 3–April 29, 2012. Postings include daily logs, videos and images, lesson plans, and a digital atlas to follow along with the expedition. Join the crew through live feeds from the expedition.
http://oceanexplorer.noaa.gov/okeanos/explorations/ex1202/welcome.html

The Gulf of Mexico at a Glance Report
One objective of the Gulf of Mexico Alliance is to build public awareness about the linkages between the Gulf region's ecological health, the quality of residents' everyday lives, and the economic vitality of the region. To this end, The Gulf of Mexico at a Glance presents regional aggregations of selected economic activities that are focused in coastal and ocean areas, as well as selected social and environmental attributes of the region.
http://gulfofmexicoalliance.org/pdfs/gulf_glance_1008.pdf

Gulf of Mexico Marine Debris Mapping Website
The NOAA Gulf of Mexico Marine Debris Project recently launched this website. Nearshore waters of Mississippi, Alabama, and Louisiana are being surveyed for the purpose of locating and mapping marine debris, identifying risks to commercial fishing and shrimping activities in the Northern Gulf of Mexico coastal zone and providing users with critical information and maps of debris laden survey areas.
http://gulfofmexico.marinedebris.noaa.gov/

Gulf of Mexico Marine Ecosystem
This video from NOAA Fisheries describes some of the interactions between species, habitats, and stressors in the Gulf of Mexico ecosystem. The video describes the many tradeoffs that NOAA Fisheries must consider to promote an ecosystem-based approach to fisheries management in the Gulf of Mexico.
http://www.st.nmfs.noaa.gov/ecosystems/ebfm/gulf-of-mexico-marine-ecosystem

Gulf of Mexico Minute
The Florida Department of Environmental Protection' s Office of Coastal and Aquatic Managed Areas offers the *Gulf of Mexico Minute* radio public service announcements. In addition to audio of the 90-second messages, the website offers downloadable scripts for all the podcasts.
http://www.supportthegulf.org/media-section/podcasts

Gulf of Mexico Projects Map
The Gulf of Mexico Alliance offers this map that allows users to view restoration and research projects in progress across the Gulf. Additional sources will data mined and their projects will be added.
http://goma-projects.blueurchin.com/?news

Gulf of Mexico Research Initiative
The goal of the Gulf of Mexico Research Initiative is to improve society's ability to understand, respond to, and mitigate the impacts of petroleum pollution and related stressors of the marine and coastal ecosystems, with an emphasis on conditions found in the Gulf of Mexico. Knowledge accrued will be applied to restoration and to improving the long-term environmental health of the Gulf of Mexico. The education resources include lesson plans, activities, multimedia, and much more.
http://gulfresearchinitiative.org/

Gulf of Mexico Science
The Gulf of Mexico Science, published by the Dauphin Island Sea Lab, is now available online. All issues, dating back to 1977, are available for download.
http://goms.disl.org/

Gulf Spill Restoration
NOAA's Damage Assessment, Restoration, and Remediation Program developed this Gulf Spill Restoration website to keep the public informed on the status of the Deepwater Horizon natural resource damage assessment and how NOAA is working with partners to restore injured resources to the region. The website offers videos, graphics, an events calendar, links to publications, and more.
http://www.gulfspillrestoration.noaa.gov/

Gulfbase
GulfBase is a database of resources about the Gulf of Mexico. The goal of this website is to regroup, synthesize, and make freely available Gulf of Mexico research information. GulfBase can help researchers, policy makers, and the general public work together to insure long-term sustainable use and conservation of the Gulf of Mexico. The website hosts a comprehensive listing of upcoming events, background information about regional ecosystems, a history of exploration, and more.
http://www.gulfbase.org/

GulfBase InfoHub
GulfBase InfoHub is a public information resource for the Gulf of Mexico from the Harte Research Institute for Gulf of Mexico Studies and the National Sea Grant Law Center at the University of Mississippi. Users can search for articles on the laws, the science, and socioeconomic issues relevant to management and use of the Gulf of Mexico.
http://www.gulfbase.org/infohub/

Gulf Finfo
This website offers information about the management of individual fisheries in the Gulf of Mexico. Visitors can search by state or individual fishery.
http://gulffishinfo.org/

G-WOW Changing Climate, Changing Culture
The "Gikinoo'wizhiwe Onji Waaban" (Guiding for Tomorrow) or G-WOW Initiative is an approach to increasing awareness of how climate change is affecting Lake Superior's coastal environment, people, cultures, and economies. It integrates scientific climate change research with place-based evidence of how climate change is affecting traditional Ojibwe lifeways; brings Native perspectives and involvement to addressing issues of climate change; and more.
http://www.g-wow.org/en-us/default.aspx