National Oceanic and Atmospheric Administration

Information Exchange for Marine Educators

Archive of Educational Programs, Activities, and Websites

P to Z

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

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 P to Z

Pacific Islands Ocean Observing System Voyager
This website is an interactive map interface for visualizing and downloading oceanographic observations, forecasts, and other geospatial data and information related to the marine environment in the Pacific Islands. The interface allows users to combine, view, download, and query thousands of ocean and coastal data and access historic, recent, and forecast information. Users can also save maps and share research and visualizations for future use and distribution.
http://oos.soest.hawaii.edu/pacioos/voyager/

Paddle Bayou Lafource, Louisiana
Back to the Bayou 2003, November 7-10, 2003, from the Barataria-Terrebonne National Estuary Program, featured a 4-day canoe and kayak trip, daytime and evening festivities, plus the opportunity to appreciate bayou communities and life along the bayou from Donaldsonville to the Gulf of Mexico.
http://paddling.btnep.org/

Papahānaumokuākea Expedition 2007
An expedition with archaeologists from the Maritime Heritage Program, the Pacific Islands Region and the Papahānaumokuākea Marine National Monument conducted non-invasive surveys on shipwreck sites at Midway Atoll, Pearl and Hermes Atoll, and French Frigate Shoals. The archaeology team's goal was to locate new wreck sites and continue the documentation of known sites. The website offers information about the mission and the wrecks.
http://sanctuaries.noaa.gov/maritime/welcome.html

Papahānaumokuākea Marine National Monument
The Papahānaumokuākea Marine National Monument is the single largest conservation area under the U.S. flag, and one of the largest marine conservation areas in the world. The website hosts information about the coral reefs and shipwrecks found in Papahānaumokuākea, along with resources about its cultural importance to Native Hawaiians. Check out the images and videos, news, educational resources, and much more on this website.
http://www.papahanaumokuakea.gov/welcome.html

Papahānaumokuākea Marine National Monument Explorations 2010
Follow along on a 25-day research expedition to Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands. The main objectives of the expedition for the maritime heritage team are to interpret these diverse archaeological sites through underwater mapping, video, and photography.
http://sanctuaries.noaa.gov/missions/2010monument/welcome.html

Papahānaumokuākea Marine National Monument Resources
Visitors can take a virtual tour of Midway Atoll National Wildlife Refuge, Tern and East Islands at French Frigate Shoals, Laysan Island, Lisianski Island, and Pearl and Hermes Atoll through Google Street View. PMNM's education materials focus on increasing understanding of ecosystem management, developing an ocean stewardship ethic, and training the next generation of leaders to be both scientifically and culturally grounded.
http://www.papahanaumokuakea.gov/news/google_streetview.html
http://www.papahanaumokuakea.gov/education/

Parent Leadership in Education: Resource Roundup
Edutopia has compiled a list of articles, videos, and other resources to help parents engage in a productive way with teachers and school.
http://www.edutopia.org/parent-leadership-education-resources

Park Cultural Landscapes
The National Park Service offers this cultural landscapes website which answers basic questions about cultural landscapes and serves as a gateway for more in-depth discoveries. New material will continue to be added, including climate change and sustainability, additional case studies, and more.
http://www.nps.gov/cultural_landscapes/

Park Science
Park Science is a research and resource management journal of the U.S. National Park Service. It reports the implications of recent and ongoing natural and social science and related cultural research for park planning, management, and policy. The most recent publication focuses on biological diversity discovery, science, and management. You can download individual articles or the entire journal.
http://www.nature.nps.gov/ParkScience/

ParkFinder App
The free Oh, Ranger! ParkFinder™ app for the iPhone and iPod Touch allows users to find parks and public lands throughout America, based on their favorite activities.
http://www.ohranger.com/app/parkfinder

Parks Canada Videos on the Internet
Parks Canada has launched video channels on YouTube, MySpace, and Yahoo Video, with videos on Canada's national parks and national marine conservation areas, as well as other historic sites. Videos will include promotional pieces, wildlife and habitat shorts, and scientists and staff discussing issues facing these protected places.
http://www.youtube.com/ParksCanadaAgency
http://www.myspace.com/parkscanada
http://ca.video.yahoo.com/people/5743950

Parks Caribbean
This new website is dedicated to providing information on protected areas programming in the Caribbean. The website offers news, background information, links to publications, and more. Further information will be added, so check back often.
http://parkscaribbean.net/

Parks Online Resources for Teachers and Students
The website for the distance education program, Parks Online Resources for Teachers and Students (PORTS) uses videoconference equipment and California's K-12 High-Speed Network to deliver units of study to classrooms around the state. These interactive programs allow California State Parks to educate students about park resources, delivering parks into the classroom. The website includes complete downloadable study units, including topics such as tidepools, elephant seals, and more.
http://www.ports.parks.ca.gov/

Parks in Peril Documents
The Parks in Peril website from The Nature Conservancy and partners offers a myriad of downloadable reports and other documents, including resource management, monitoring and evaluation, rapid ecological assessment, and more.
http://www.parksinperil.org/resources/publications.html

Parks & Recreation Blue Issue
The *Parks & Recreation* Blue Issue, the July 2013 issue of the National Park Service's *Parks & Recreation* magazine, focuses on the wet side. Articles include Water is Life to Parks, Take it to the Bank, For the Love of Trails, and more. You can download an e-magazine or connect to individual articles.
http://www.parksandrecreation.org/
http://digital.parksandrecreation.org/

Parkwire
The George Wright Society is dedicated to the protection, preservation, and management of cultural and natural parks and reserves through research and education. The website offers the daily news service, Parkwire: Protected Area News from Around the World. Most articles consist of 2-3 paragraphs from the beginning of the story and a link to the full story. The focus is on management issues, relevant research, and more.
http://www.georgewright.org/

Participatory Management Clearinghouse for Wetlands
The Participatory Management Clearinghouse has been set up to facilitate the sharing of information concerning participatory management of natural resources and disseminate field experiences. Classified thematically by ecosystems, regions, or themes, the posted documents, specific projects and case studies cover issues such as biodiversity and traditional knowledge, gender, water, equitable sharing, protected areas, and indigenous peoples. The website includes dynamic maps and a search system.
http://www.PMCnet.org .

Partners Outdoors Conference Videos
The American Recreation Coalition offers videos of the general sessions of the 2014 Partners Outdoors conference.
http://www.funoutdoors.com/node/view/3152

Pascagoula River Curriculum
The Land Trust for the Mississippi Coastal Plain and partners offer the downloadable Pascagoula River Curriculum, designed to provide place-based watershed information to upper elementary and middle school teachers. There are over 80 lessons with corresponding test modules targeted to compliment elementary curricula. You can download the complete Pascagoula River Lesson Plan or select specific lessons or activities through the table of contents.
http://www.ltmcp.org/teacher-resources/pascagoula-river-watershed/

Passport to Adventure
"Passport to Adventure" is an educational game featuring all the San Luis Obispo, California area state parks. Passport holders visit any state park from Pismo Beach to Morro Bay and seek answers to 30 questions. There are different levels of prizes for the game. All proceeds go to supporting the educational efforts of the Central Coast Natural History Association.

http://www.ccnha.org

PAST Foundation
The mission of the nonprofit educational PAST Foundation is to promote a better understanding of history and culture by teaming professional anthropologists and historians with the public to explore potential cultural sites both locally and globally. Professional anthropologists and archaeologists are teamed with K-12 students to explore potential cultural sites in their area. Planning is currently underway for the PAST Foundation's 2005 Field School.
http://www.pastfoundation.org/

Pathways for Play
The guidebook, Pathways for Play: Best Practices for Children, Families, and Communities, is available upon request at no cost. In addition, interactive tools on the supporting website allow visitors to share stories, photographs, and ideas, and discover books and downloadable seasonal activities to help maximize pathway enjoyment.
http://www.pathwaysforplay.org/

Pathways to Science
The Pathways to Science website was created by the Institute for Broadening Participation, a non-profit organization created to design and implement strategies to increase access to STEM (Science, Technology, Engineering, and Mathematics) education and careers for diverse underrepresented groups. The website offers resources for educators and students who are looking for undergraduate summer research opportunities, graduate fellowships, and postdoctoral positions.
http://www.pathwaystoscience.org/index.asp

Patuxent Wildlife Research Center
The Patuxent Wildlife Research Center in Maryland has a diverse set of ongoing research projects dealing with wildlife and natural resources in and around the region. Their website offers links to a wide range of materials available on the web, including a section on frog calls (with species lists for many states and quizzes), video clips of Atlantic sea ducks, information about surface elevation tables, and much more. The education section includes ecotoxicology lesson plans, an extensive bird identification section with quiz, educational science notes, glossary, and more.
http://www.pwrc.usgs.gov/

Pay per nature view: Understanding tourism revenues for effective management plans
This report will be of interest for those looking at tourism as an economic development tool and finance mechanism for conservation. This report asks two main questions: What mechanisms can protected areas use to raise funds from tourism? and To what extent should protected areas raise funds from tourism? The report describes six survival essentials for protected areas, and uses these as a context for analysis of the role and potential of tourism in protected areas.
http://www.leedsmet.ac.uk/lsif/the/documents/PayPerNatureView02.pdf

PBLU
PBLU is an online social network of educators learning and sharing how to do Project Based Learning. PBLU provides five free online two-week classes featuring Common

Core aligned projects that teachers may customize and implement. Participants receive tips from an experienced PBL facilitator and feedback from the online community.
http://www.pblu.org/

The PBS Borders Environmental Project
Each POV Borders episode asks visitors to consider an aspect of their everyday lives in ways that challenge their preconceptions, and expand our own "borders" of understanding. Lesson plans for K-12 teachers are designed to facilitate online storytelling and sharing. Each of the three downloadable lesson plans focuses on Earth, Water, or Air. Also check out the link to the Watershed Game (http://www.bellmuseum.org/cgi-bin/start.pl?user=bellmuse&prog=start.pl&name=&submit=Let%27s%2Bgo!)
http://www.pbs.org/pov/borders/2004/educators/index.html .

PBS LearningMedia
Teachers' Domain and NOVA Education resources can now be found through PBS LearningMedia. This educators' website offers more than 14,000 learning objects to supplement classroom curricula. Standards-aligned resources include videos, documents, images, and activities in math, science, social studies, and other core subjects. Use the easy search function to find curricula, specific subjects, and more. Browse subjects, checkout the self-paced professional development, and more.
http://www.pbslearningmedia.org/

PBS Teachers: STEM Education Resource Center
PBS offers this resource center with STEM-related resources drawn from a range of PBS programs, including NOVA, Nature, and Cyberchase. Sections include Science Resources, Free Webinars, and more.
http://www.pbs.org/teachers/stem/

Peace Corps Challenge Game
Teens who play this game are assigned to work in the small town of Wanzuzu, where they must study and understand the residents and the problems their community faces. Students must solve nine critical challenges to help Wanzuzu become a better, healthier village. Teachers can access lesson plans on topics including water contamination, soil runoff, and more.
http://www.peacecorps.gov/kids/

Pedagogy in Action
The Science Education Resource Center (SERC) at Carleton College offers many classroom resources, including lesson plans on science, technology, engineering, mathematics, and more. This module looks at the undergraduate research experience. Instructors looking to more deeply engage their undergrads are using collaborative research projects to advance student knowledge and allow students hands-on, experiential learning.
http://serc.carleton.edu/sp/library/studentresearch/index.html

PEER Educator Materials
The Partnership for Environmental Education and Rural Health (PEER) offers myriad science resources for middle and high schools, and the Lesson Plan Library can be browsed by category. There are Integrative Curricula, Life Science Curricula, and many

more. Check out Ecosystems, Water's the Matter, and much more. This website is worth spending time exploring.
http://peer.tamu.edu/default.asp

PEER Teacher Requested Resources
The Partnership for Environmental Education and Rural Health (PEER) at Texas A&M University offers this website with a searchable and browseable database of lesson plans, activities, and more that have been developed at the request of teachers. Be sure to check out the other resources linked to from this site.
http://peer.tamu.edu/DLC/NSF_Resources.asp

Pelagic Realm Poster
This Pelagic Realm wall poster (25x36 inch) can be a useful classroom resource. It includes 109 pen-and-ink illustrations of pelagic marine life from bacteria to whales and from the surface to the deep sea. The illustrations are clustered by trophic group and depth and are accompanied by the name, taxonomic group, and maximum known size of each species. The poster is available through EBay - search Pelagic Realm poster.
http://www.ebay.com/

Penguin Science
Take your students on a virtual field trip to the Adélie Penguin breeding colony at Cape Royds, Ross Island, Antarctica. Penguin Science is an NSF funded project engaging and educating classrooms and the public with Antarctic penguins as they raise their chicks and cope with global climate change. Follow along with live pictures starting November 10, 2011, check out the classroom activities, and more.
http://www.penguinscience.com/

Penguin Science Education Page
This website offers activities to help students learn about Adelie penguin life, history, and their relationship to climate change. Students can also send questions to the researchers who study penguins. There are PowerPoint presentations for use in your classroom about Antarctic Penguins, Antarctica, and global climate change; teaching notes are included.
http://www.penguinscience.com/classroom_home.php

Pennies for the Planet
World Wildlife Fund sponsors the *Pennies for the Planet* campaign. Kids learn about three priority regions around the world, helping get them excited about conservation and connecting environmental education with environmental action. The 2003 program includes the Everglades and South Florida. The website includes links to free posters, education activities, and additional educator's materials.
http://www.worldwildlife.org/windows/pennies/

People in Fisheries
The Fall 2009 issue of *Eddies*, an online magazine from the Fish and Wildlife Service, explores the diverse careers of the fisheries workforce, from geneticists, maintenance workers, and veterinarians to pharmaceutical researchers, animal caretakers, and fish culturists. Be sure to check out all the archived issues.
http://www.fws.gov/eddies/

People of NOS
Students can read interviews with an extensive, and still-growing, list of people working on ocean issues through the *People of NOS* (NOAA Ocean Service) website. Read about the careers of people working on issues of science and research, education, conservation and restoration, and more.
http://oceanservice.noaa.gov/profiles/welcome.html

People and Reefs: Successes and Challenges in the Management of Coral Reef Marine Protected Areas
This 100-page publication was prepared by the UN Environment Programme in cooperation with the International Coral Reef Action Network. It features case studies of coastal coral-reef management initiatives worldwide, with lessons learned from each. The report introduces some of the key issues in coral reef conservation and the role of ICRAN and the UNEP Regional Seas Programme. Seven of the case studies are from the Caribbean. The report is downloadable from the UNEP website.
http://www.unep.org/regionalseas/Publications/itmems2reportfinal.pdf

The People Speak Global Debate
The United Nations Foundation project, The People Speak, encourages young people to be actively engaged on global issues and to understand the value of global cooperation. The 2007 People Speak Global Debate topic of climate change will involve high school students researching the debate topic and preparing clear, persuasive arguments for both sides of the issue. The debate topic is Resolved: Market mechanisms are preferable to regulatory approaches in reducing carbon emissions.
http://thepeoplespeak.org/peoplespeak/About/highscho

Peppy's Coral Kingdom
This children's book is aimed at educating students in Grades 1-5 about threats to coral reefs, with a heavy emphasis on coral disease and anthropogenic stressors. The book was created by a Nancy Lucas in consultation with scientists from the Marine Resources Center at Fort Johnson. The website includes links to several example pages, along with ordering information.
http://www.thirdfloorcell.com/peppy.html

Perfect Disaster
The Discovery Channel offers this website to complement *Perfect Disaster,* a series of programs on severe weather and other natural disasters. The site includes a number of historic disaster puzzles, where visitors can piece together the post-eruption locale of Pompeii and the mighty tornado that swept through Kirksville, Maryland in 1899. Other sections include information about tornados, solar storms and a hazard quiz.
http://dsc.discovery.com/convergence/perfectdisaster/perfectdisaster.html

Permafrost/Active Layer Monitoring Network
With support from NASA and the International Polar Year, the University of Alaska Fairbanks launched the Alaska Permafrost Project, a network of over 100 schools in Alaska and Yukon, Canada that measure permafrost temperature and active layer depth on a weekly basis. The network places all of their data plots and latest information on their website as well as Google Earth. The website also offers other education materials.
http://www.uaf.edu/permafrost/

Peter's Online Typing Course
For those still using the hunt and peck method but unable to build up speed, check out Peter Hudson's free website. It's a place for "beginning typists and frustrated hunt-and-peckers who want to move from four-finger typing to full-blown touch typing."
http://www.typing-lessons.org/

Pew Fellowship Nominators
The Pew Fellows Program in Marine Education solicited nominators for Pew Fellowships. Their goal was to recruit a diverse group of nominators who have knowledge of outstanding individuals doing innovative work in marine conservation around the world.
dmeck@neaq.org

Photo of the Week
SeaWeb and the Marine Photobank offer a new feature on SeaWeb's site - Photo of the Week. Each week, a photo illustrating current ocean issues will be displayed on the SeaWeb home page, along with the story behind the photo on the Marine Photobank Photo of the Week page.
http://www.marinephotobank.org/photocenter/photoofweek.php

PhotoZone
The National Wildlife Federation offers Ranger Rick's PhotoZone to help young photographers learn to take and share photos of wildlife and wild places. There are photo tips, tricks, contests, and more.
http://www.nwf.org/kidzone/kzPage.cfm?siteId=3&departmentId=80

Physical Geography Animations and Webcam
The Wycombe High School, UK website offers a variety of physical geography animations, including coastal processes, animated rivers, atmosphere, glaciers, and much more. The animations can help students understand some of the long term changes that take place on and close to the surface of the Earth. There are also links to live geography webcams.
http://www.school-portal.co.uk/GroupHomePage.asp?GroupID=12426

Physorg.com
Physorg.com offers online news and articles related to science, physics, and technology. Categories include Space & Earth science, General Science, and more. Topics one day might include climate change, tsunamis, carbon sequestration, and much more.
http://www.physorg.com/

Phytopia: Discovery of the Marine Ecosystem
This educational CD-ROM, developed by Bigelow Laboratory for Ocean Sciences, University of New England, and NASA's Jet Propulsion Laboratory, is available for the price of shipping. The CD provides a window to the world of the oceans' microscopic life. Phytopia consists of three major modules: "Phyto Files," "Phyto Factors," and "Special Topics." Other features include an image-based glossary and summaries of relevant topics.
http://www.bigelow.org/phytopia/.

Phytoplankton Image Gallery
NCCOS's Center for Coastal Environmental Health and Biomolecular Research's Phytoplankton Monitoring Network offers information about harmful algal blooms and volunteer monitoring. The online Image Gallery offers images, micrographs, and line drawings of diatoms, dinoflagellates, and more. There are also links to a free phytoplankton app for mobile devices.
http://www.chbr.noaa.gov/pmn/image_gallery.aspx

Phytoplankton on the Web and in the Classroom
The online phytoplankton library from the Center for Integrated Marine Technologies was initially created to help provide information about the organisms behind the spring 2007 algal blooms in the Monterey Bay. It includes species found in the waters along California, Oregon, and Washington. The Central and Northern California Ocean Observing System created a classroom guide on phytoplankton and Harmful Algal Blooms, with a concentration on the West Coast and California species.
http://cimt.ucsc.edu/habid/habhome.html
http://www.cencoos.org/sections/classroom/algal_blooms.shtml

Picture Guide to Common Stony Corals
The Flower Garden Banks National Marine Sanctuary has posted a new Picture Guide to Common Stony Corals of Flower Garden Banks, downloadable from this website under the Coral Guide link. While on the website, check out the Manta Catalog, Science Posters, and more.
http://flowergarden.noaa.gov/document_library/scidocuments.html

Picture Post
Picture Post, part of the Digital Earth Watch network, offers the means for people to study and analyze their own findings using Digital Earth Watch image analysis software. Picture Post participants study change over time in their local area, view NASA satellite imagery taken on the same day as their pictures, and contribute towards improving their own communities. The website includes software downloads and guides, monitoring suggestions, and more.
http://picturepost.unh.edu/

PicturePosts: Using Cameras to See Change at Local Parks
The Friends of Menotomy Rocks Park and Friends of Fresh Pond Reservation have created two PicturePosts in each park to help see and measure changes in local parks. They have installed that help visitors take pictures of the same landscape each time. The PicturePost is a secure post anchored in the ground, with a round disk and an octagonal plate attached to the top. Each post has specific information inscribed on it, so with the click of the camera, the location of the set of images is automatically marked.
http://www.picturepost.smugmug.com

Pictures from Andros
Sean Nash is a high school biology instructor in Missouri, and a prolific underwater (and above-water) photographer. He has posted images taken during Andros Island sailing field studies, part of the marine biology program in the Saint Joseph School District. He is happy to share the photos for educational purposes (as always, with attribution). Check them out at the two flickr websites, and while you're looking around, check out the links to his classroom network and blog site.
http://www.flickr.com/photos/nashworld/sets/72157616761811732/

http://www.flickr.com/photos/nashworld/3351791844/in/set-72157615192501798/

PIMRIS Portal
The Pacific Islands Marine Portal project is a collaborative project to improve access to Pacific marine information for the Pacific Islands community. The portal offers news, articles, and directories of websites relevant to Pacific fisheries and to the coastal and marine environment of the Pacific.
http://www.pimrisportal.org/pop/index.php?option=com_content&view=frontpage&Itemid=1

Pinterest for Educators
Principal Eric Sheninger offers a short blog about using the social media application, Pinterest, for education.
http://www.edutopia.org/blog/pinterest-for-educators

Pito Deep Expedition
Teachers and students can explore the geological, geophysical and geochemical study of the upper ocean crust exposed at Pito Deep, west of Easter Island. From January 30 - March 8, 2005, scientists will be documenting the scientific expedition through "Dispatches from Sea" located on the Pit Deep Expedition website.
http://www.nicholas.duke.edu/pitodeep/index.html

Place-Based Education
The second edition of *Place-Based Education—Connecting Classrooms and Communities* is available. The book reviews academic research, practical examples, and step-by-step strategies drawn from classrooms throughout the United States which emphasize the connection of school, community, and environment.
http://www.oriononline.org/pages/ob/nls/index_nls.html

Places We Live
Project Learning Tree has developed new curriculum materials to give students an awareness of the environmental, social, and economic impacts of decisions connected to community growth and change. *Exploring Environmental Issues: Places We Live* gets students exploring their own neighborhoods, learning about their community's development through time, and involved in local community action projects.
http://www.plt.org/cms/pages/31_41_39.html

Plan Your Summer with the Bridge
It is time to start planning your summer experiences, and the Bridge can help. The Bridge contains summer opportunities and year-round courses, workshops, and other programming for educators and students. Each program on the Bridge is complete with a link and brief description, and because we are constantly adding new resources and opportunities, we suggest checking back often. Those with summer programs that are not currently found on the Bridge are encouraged to submit their website for inclusion.
Educator Summer Programs http://www.marine-ed.org/bridge/index_teacher_summer.html
Student Summer Programs http://www.marine-ed.org/bridge/index_summer.html

Planet Connect
Planet Connect, a component of Classroom Earth, is an online social network where high school students can learn about current environmental issues, funding opportunities, green colleges, and environmental careers.
http://planet-connect.org/

Planet Earth
The Discovery Channel presents *Planet Earth*, an eleven-part series showcasing global habitats from deep oceans to mountains. The website offers video clips, background information, online animal guides, games, and much more. The Journey to Planet Earth website includes information about the programs, basic ecosystem and country profiles, educational resources including downloadable teacher guides, and more.
http://dsc.discovery.com/guides/planetearth/planetearth.html
http://www.pbs.org/journeytoplanetearth/

Planet Earth
Annenberg Media offers this video instructional series for college and high school classrooms and adult learners. It teaches earth science, geology, oceanography, climatology, and astronomy through footage and insights from noted scientists. *The Blue Planet* will air January 11 and May 17, 2006; the *Climate Puzzle* airs January 18 and May 24, 2006. The online Simulcast can be viewed at http://www.learner.org/channel/broadband/video.html.
http://www.learner.org/channel/series49.html

Planet FOSS for Kids
The Lawrence Hall of Science offers Planet FOSS (Full Option Science System) as a way to engage kids in science curriculum by getting them to observe the world through their own experiences and take and share photos. Sections include Diversity of Life, Weather & Water, and more. Check out the Populations & Ecosystems student worksheet.
http://www.fossweb.com/planetfoss/

Planet H2O
Planet H2O explores water technology, water hot-spots, and careers involving water. View video clips from the Planet H2O TV special plus download lesson plans for K-12, teaching guides, and environmental activities to use in the classroom.
http://www.thirteen.org/h2o/index.html

Planet H2O
Planet H2O, a two-part special from Thirteen/WNET New York, will premier on public television in April to mark Earth Day. The two episodes, The Secret Life of Water and Water World, focus on fresh water systems around the world and their impact on land, air, and living things. In addition, the website will offer a downloadable teachers' guide to accompany the program.
http://www.thirteen.org/edonline/educators.html

Plankton Chronicles
The Plankton Chronicles are sponsored by the Centre National de la Recherche Scientifique and partners. This series of videos and photos reveals the beauty and diversity of marine organisms that drift with the currents. The project uses state-of-the-

art optics to reveal the beauty and diversity of planktonic organisms. The materials are available in English, French, and Spanish.
http://www.planktonchronicles.org/en

Plankton*net
Plankton*net is a communal source of information about marine phytoplankton. Users can browse through an extensive collection of descriptions and images organized alphabetically or by taxon. Links are provided with each species description to numerous websites containing information about the organism.
http://www.planktonnet.eu/

Planning and Drought
Planning and Drought outlines steps for drought planning. It offers a guide for planners and communities to explore what drought is, how to track it, and how to mitigate its effects. The book includes eight case studies illustrating a range of drought's consequences and how different organizations prepared for and responded to them. The (large) document is available as a free download. Check out the Drought.gov website, sign up for the newsletter, and more if you haven't visited in a while.
http://drought.gov/media/pgfiles/PAS574.pdf

Planning Trails with Wildlife in Mind: A Handbook for Trail Planners
The National Trails Training Partnership website hosts this downloadable manual which discusses how to balance the benefits of creating trails with stewardship of nature and wildlife.
http://www.americantrails.org/wild/

Plant Field Guide – Grand Bay NERR
The Mississippi Department of Marine Resources Grand Bay National Estuarine Research Reserve has posted its field guide on-line. *Selected Plants of Grand Bay National Estuarine Research Reserve and Grand Bay National Wildlife Refuge* includes some of the most popular regional plants and wildflowers. The guide provides visitors with color photos and descriptions of several coastal wetland and terrestrial plants found within the reserve, along with highlights of selected coastal habitats.
http://www.dmr.state.ms.us/Coastal-Ecology/GBNERR/field-guide/field-guide.htm

Plant Invasions in Protected Areas
Plant Invasions in Protected Areas - Patterns, Problems and Challenges reviews plant invasions in protected areas around the world. Springer Link offers the opportunity to review parts of the book prior to purchase.
http://link.springer.com/book/10.1007/978-94-007-7750-7

Plant Stalkers
Plant Stalkers is a citizen science program from Duke biologist Julie Reynolds and the Eno River State Park in Durham. Volunteers, many of whom have little or no specific scientific training, help scientists and park rangers monitor the distribution of invasive plants through the use of a GPS unit during routine outdoor activities such as hiking. After training and certification through the project, volunteers mark locations of invasive species and upload the data through the Internet.
http://www.science-writing.org/citizenscience.html

Plants of the Eastern Caribbean
This online photo database is devoted to the native and naturalized flowering plants of the islands of the Eastern Caribbean. The aim of the website is to serve as an accessible resource for identifying the plants of the archipelago and to provide a forum for sharing information on Caribbean plants and their conservation. The database comprises about two thousand flowering plants, mainly those found in the wild, although a few commonly cultivated plants are included.
http://ecflora.cavehill.uwi.edu/

Plastic Debris in the Marine Environment
Ocean Science Trust, in partnership with University of Southern California Sea Grant, offers this synthesis of existing information on the sources, abundance, and distribution of plastic debris in the California marine ecosystem, including the emerging field of research on the toxicology of plastics in seawater. Both the summary and complete report may be downloaded from the website.
http://calost.org/science-initiatives/?page=marine-debris

Plastic in the Ocean
Marine debris has recently been highlighted in newspapers and was featured on Canada's Discovery Channel. TV documentary maker Ian Connacher describes a flood of junk flowing into the sea – some to circulate endlessly in currents, some to be eaten by fish, and then by humans. He produced a feature piece on ocean plastic sampling, highlighting the implications of land-based sources of pollution on the marine environment.
http://www.exn.ca/dailyplanet/view.asp?date=1/15/2004 .

Plastic Oceans
Plastic Oceans offers a documentary film about plastic in our oceans.
http://www.plasticoceans.net/

Plastics at SEA
The Sea Education Association offers this website allowing visitors to follow them as they embark on the Plastics at SEA: North Atlantic Expedition, a 35-day research cruise to study the accumulation of plastic marine debris in the North Atlantic Ocean. The website offers a daily journal, science results, biographies, and more.
http://www.sea.edu/plastics/index.htm

Plastics at SEA – North Pacific Expedition
The research vessel, the *SSV Robert C. Seamans*, set sail on Sea Education Association's second research expedition dedicated to the study of plastic marine debris. The expedition left in October from San Diego on the 2,500-nautical mile voyage to Honolulu, sailing west into the popularly dubbed "Great Pacific Garbage Patch".
http://www.sea.edu/plastics

Plastisphere
The episode of World Ocean Radio entitled "234: The Plastisphere" explores recent studies by a collaboration of research scientists, institutions, and vessels which have discovered a new ecological habitat: microbes colonizing and thriving on reefs of plastic that pollute our ocean.
http://worldoceanobservatory.org/radio-item/234-plastisphere

Plates on the Move
Plates on the Move is an interactive website from the American Museum of Natural History. It explains how plate tectonics cause earthquakes, volcanoes, and tsunamis.
http://ology.amnh.org/earth/plates/index.html

Play Decide
New Economics Foundation offers Play Decide, a website with a downloadable kit for a game that examines global warming and climate change, through play participation in setting policies. The website also allows users to upload their results for a worldwide regional comparison. (The game was inspired by Democs (deliberative Meeting of Citizens), a card game that is also downloadable at http://www.neweconomics.org/gen/democs.aspx).
http://www.playdecide.org/

Pocket Guide to Marine Debris
The Ocean Conservancy and the EPA published the booklet, *Pocket Guide to Marine Debris.* This book is designed for beach cleanups, to serve as a reference to standardize terminology for marine debris items and to help volunteers identify unknown debris items. It offers Quick Tips about what to bring and how to prepare for different situations that may be encountered during debris cleanup. The booklet can be found in different formats on the web: as html, a slideshow, and a downloadable pdf file.
http://sacoast.uwc.ac.za/education/resources/marinedebris/index.htm
http://www.slideshare.net/vicmanlapaz/pocket-guide-to-marine-debris-presentation
http://www.cobsea.org/cleanupeas/docs/ICC_PocketGuide_EN.pdf

Podcast of Life
Introduce your students to marine biology and biodiversity through the Podcast of Life. Developed for students aged 9-13, the 5-minute podcasts highlight marine species with high student appeal and available relevant classroom resources. The website also offers educational materials, meet the scientists, and extras. Student contributions are solicited. There will be a new podcast every two weeks.
http://education.eol.org/podcast

Point2Nature Environmental Education Software Developers
Point2Nature by CD Meyer, Inc. is a multimedia company that specializes in environmental education software for zoos, aquariums, nature centers, and museums. They use graphics, dynamic animations, music, sound effects, panoramic photography, and video to engage students.
www.point2nature.com

Poisoned Waters Documentary and Teacher's Guide
Poisoned Waters, a two-hour PBS documentary, examines how water pollution from many sources threatens human health and the environment and also explores potential answers to the crisis. The website includes the complete video, broken into easily viewed sections, along with a teacher's guide intended for grades 9-12. The transcript of the video is also available from the website.
http://www.pbs.org/wgbh/pages/frontline/poisonedwaters/

Polar Bibliography
A comprehensive polar bibliography has been prepared in the NOAA Central Library Network. *International Polar Year 2007-2008 Resources on Polar Research in the*

NOAA Central Library Network: A Selected Bibliography reflects the NOAA Library Network's unique printed and online resources on exploration and research in the polar regions from the 18th century to the present, in all formats, including print, online full-text documents, digital videos and images, online cruise data, and web resources.
http://www.lib.noaa.gov/uhtbin/webcat

PolarConnect
PolarTREC (Teachers and Researchers Exploring and Collaborating) will offer PolarConnect live online presentations throughout January, 2011. These free National Science Foundation-funded events connect participants to scientists working in Antarctica. Each event is also archived for downloading and later viewing. Free registration is required.
http://www.polartrec.com/polar-connect

Polar Cruise Blog
This blog is a project associated with the Palmer Station site, a member of the Long-Term Ecological Research Network. The cruise, January 6-February 9, 2009, is one of the annual interdisciplinary cruises contributing to the creation of a long-term time series record which began in 1991.
http://pal.lternet.edu/outreach/blogs/cruise/

Polar Oral History Program
This program from Ohio State University and partners documents the early years of American polar exploration by interviewing those who were in the polar regions since the 1930s. The collection provides transcripts of these oral interviews.
http://kb.osu.edu/dspace/handle/1811/6039

Polar-palooza
Polar-palooza is an International Polar Year education and outreach project through a multimedia effort to explain the importance of the polar regions and clear up misconceptions some people may have about them. Scientists and Arctic residents tell personal stories of life and research in polar regions. The website includes video footage and Internet resources. The multimedia exhibit and national tour will visit California, New Mexico, Florida, Georgia, and Louisiana in the fall of 2007.
http://www.nasa.gov/mission_pages/IPY/snow/PolarPalooza.html

Polar Portal
This website reports the results of Danish monitoring of Arctic ice and includes details such as surface conditions, sea ice extent, temperatures, glacier positions, and mass changes. Links to resources, news, and information on monitoring methods are also available.
http://polarportal.dk/en/home/

Polar Regions Workshop Resources
The International Polar Year Online Workshop from COSEE West and the College of Exploration took place online April 16-28, 2007. The website offers archived lectures, PowerPoint shows, and educational materials related to both the Arctic and Antarctic regions. In addition, the Resources section offers an extensive list of websites with educational resources and activities.
http://www.coexploration.org/cosee_west/ipy/

Polar Sciences Special Collection
Teachers' Domain offers their Polar Sciences Special Collection, funded by the National Science Foundation, with 20 new resources about the Arctic and the Antarctic, plus resources from existing collections, a lesson plan, and more.
http://www.teachersdomain.org/exhibits/ipy07-ex/index.html

Polar Visions
Polar Visions is an educational film about the effects of changing climates on humans and ecosystems, particularly in polar regions. The film contains seven stand-alone segments appropriate for use in classrooms and informal settings from the middle level through college, and was developed to align with the National Science Education Standards across all science subjects. You can watch the first episode or download it from the website, or contact Tina Arthur for a copy and standards alignment information
https://www.denveropenmedia.org/project/polar-visions
Contact Tina Arthur at tina.arthur@colorado.edu

PolarTREC
PolarTREC (Teachers and Researchers Exploring Collaborating in the Arctic and Antarctic) is a program funded by the National Science Foundation in which K-12 teachers participate in polar research, working closely with scientists as a pathway to improving science education. The website will offer new Learning Resources, a Virtual Base Camp, and more, starting in spring, 2007. Check out the Antarctic Journal (above), and archives of earlier base camp portals and lesson plans.
http://www.polartrec.com/

PolarTREC Expeditions
Follow along with teachers on Arctic and Antarctic PolarTREC expeditions. The current expedition explores adaptations of marine worms with teacher Michael League from Delaware. Upcoming expeditions will explore winter sampling, human impacts, and much more. Be sure to check out the archives.
http://www.polartrec.com/expeditions

PolarTREC Learning Resources
PolarTREC (Teachers and Researchers Exploring Collaborating in the Arctic and Antarctic) is a program funded by the National Science Foundation in which K-12 teachers participate in polar research, working closely with scientists as a pathway to improving science education. PolarTREC Learning Resources is a collection of articles, lessons, activities, interactive media, and more for educators, students, or anyone interested in teaching or learning more about the science of the Arctic and Antarctica.
http://www.polartrec.com/learning-resources

PolarTREC Live
Sign up to talk with teacher Amber Lancaster aboard the *NB Palmer* off the coast of Antarctica, April 9, 2012. Her team is part of the LARISSA project working to understand the changes caused by the Larsen Ice Shelf.
http://www.polartrec.com/expeditions/impacts-of-the-larsen-ice-shelf-system-on-the-weddell-sea

PolarTREC Season
The PolarTREC expedition season is in full swing. Teachers can be found in Alaska, Siberia, and Norway with scientists studying spiders, permafrost, tundra, climate change,

and archaeology. Check out the learning resources, follow an expedition, connect with teachers in the field, and much more.
http://www.polartrec.com/

PolarTREC in the Southern Ocean
Follow along with the bilingual (English and Spanish) journals of teacher Juan Botella as he travels with researchers from McMurdo Station, Antarctica to Punta Arenas, Chile aboard the U.S. research vessel *Nathanial B. Palmer,* February 8-April 20, 2011. They will be collecting data from the Bellingshausen, Amundsen, and Ross Seas and the Southern Pacific Ocean to research seawater property changes in the Southern Ocean. Read the journals and post your questions in the Ask the Team forum.
http://www.polartrec.com/expeditions/seawater-property-changes-in-the-southern-ocean

Pole-to-Pole Web Forum
GLOBE Seasons and Biomes is an inquiry- and project-based initiative that monitors the interannual variability of seasons in different biomes. Students from around the world will be able to join in a webchat and forum on April 10-11, 2008. They will be able to ask scientists questions about current polar and boreal forest research, their own research interests, and topics that will lead to successful school/student research projects.
http://globe.gov/fsl/html/templ.cgi?ipy_video08&lang=en&nav=1

Politics and Socio-Economics of Ecosystem-Based Management of Marine Resources
The journal Marine Ecology Progress Series has published 13 papers under the theme "Politics and socio-economics of ecosystem-based management of marine resources." Although the journal is traditionally available by subscription only, this theme section is available online for free.
http://www.int-res.com/articles/meps_oa/m300p241.pdf.

Pollinator Resources
The Pollinator Partnership celebrates the final week in June as National Pollinator Week. Pollinator Week has grown to be an international celebration of the valuable ecosystem services provided by bees, birds, butterflies, bats and beetles. The website offers links to many educational resources, including *Nature's Partners: A Comprehensive Pollinator Curriculum for Grades 3-6,* games, planting guides, and much, much more.
http://pollinator.org/index.html

Polyps in Peril
Polyps in Peril is an animated video by cartoonist Jim Toomey, narrated by Celine Cousteau. The video highlights the importance of coral reefs to people, the threats that reefs face, and what individuals can do to help save coral reefs.
http://www.youtube.com/watch?v=Jn5-ARXmQlQ&feature=youtu.be

The Polyquarium
The Macrogalleria is a website from the Department of Polymer Science at the University of Southern Mississippi. The project provides working knowledge of polymers and related concepts to students of all levels, at multiple levels. The program is informative and entertaining to both beginners and more advanced students of polymer science. The Polyquarium mimics aquarium displays.
http://www.psrc.usm.edu/macrog/sea/index.htm

P.O.N.D. – Protecting Our Natural Diversity
South Carolina High School students became interested in habitat encroachment and water pollution at their school. Students researched, designed, and implemented a variety of solutions aimed at increasing wildlife diversity, improving natural habitat, educating the community about environmental issues, and decreasing the amount of pollution entering wetlands. Projects included a riparian buffer zone around storm water retention pond, storm drain education, a nature trail, and bird habitat.
Contact Margaret Spigner at Margaret_Spigner@charleston.k12.sc.us

Population Connection
Population Connection's education program is a national population education program with a strong emphasis on teacher training for educators of grades pre-K through 12. The program offers age-appropriate curricula to complement students' science and social science instruction about human population trends and their impacts on natural resources, environmental quality, and human well-being. In addition to the curriculum, they provide hands-on training to teachers and student teachers.
http://www.populationeducation.org/index.jsp

Population, Health, and Environment Resources
Check out these resources on the intersection of population, health, and the environment.

- Population, Health, and Environment Toolkit
  https://www.k4health.org/toolkits/phe
- Lessons From the First Generation of Integrated Population, Health, and Environment Projects
  http://www.wilsoncenter.org/sites/default/files/Focus_12.pdf
- Environment, Population, and Health research programs
  http://www.eastwestcenter.org/research/research-program-overview/environment-population-and-health
- Marine Ecosystems and Management Vol 7, No. 6
  http://depts.washington.edu/meam/issues.html

Portal to Papahanaumokuakea
Join students from Duke University's Nicholas School of the Environment as they examine the challenges associated with managing and conserving marine biodiversity, using aspects of the Papahanaumokuakea Marine National Monument in the Northwestern Hawaiian Islands as the focus of several case studies. Check out their daily blogs and videos, and comment on what they are learning and the work they are doing at this remote marine wilderness.
http://www.nicholas.duke.edu/hawaii/
http://www.nicholas.duke.edu/hawaii/2010/

PortalOceanico.net - The Ocean Portal
This gateway is supported by UNESCO, and offers links to sources of ocean information on South America and the Caribbean. Some first-level topics include Education and Training; Information by Country; and more. Select "English" under the idiom box (left side of screen) to view site in English. Some items are available only in Spanish.
http://www.portaloceanico.net/

Postcards from the Eddy
ECOHAB Pacific Northwest is a 5-year multi-disciplinary project to study the physiology, toxicology, ecology and oceanography of toxic Pseudo-nitzschia species off the Pacific Northwest coast in the Juan de Fuca eddy. The resident Teacher At Sea, Herb Bergamini, posts "postcards" of his experiences on the R/V Atlantis during the 21-day research cruise including photos, daily logs, and interviews with the crew. He also responds to students' questions about oceanography and life at sea.
http://herb.northwestschool.org .

Postcards from the Poles: Antarctica
Scientists and science educators on expeditions Antarctica are describing what it's like to do science in Antarctica and what they are learning about the place. Educators will be sending in virtual postcards to describe the experience this season as Adelie penguin chicks hatch and grow on Ross Island. Other science educators on a research team with the Antarctic Geological Drilling Project will be sending in postcards documenting environmental changes that have affected the continent in the past.
http://www.windows.ucar.edu/tour/link=/people/postcards/antarctic_post.html&

Posters of Deepwater Gulf Species
The Flower Garden Banks National Marine Sanctuary research team offers a poster series depicting the conspicuous biota of the deepwater habitats of the Northwestern Gulf of Mexico, from depths between 50m to 150m. The poster series was developed to support the Secrets of the Gulf Expedition. The series includes separate posters for antipatharians, octocorals, sponges, fishes, and algae/invertebrates. High and low resolution versions of these posters are available.
http://flowergarden.noaa.gov/document_library/sci_documents.html

Posters of Marine Life
NOAA's National Marine Fisheries Service has reprinted its historic series of posters depicting species of fish, shellfish, marine mammals, and sea turtles that are indigenous to the United States. Commissioned over 30 years ago, these posters have become classics and continue to be one of the most requested items by constituents and school teachers alike. The eight posters can be viewed and purchased individually at the Government Printing Office's on-line bookstore.
http://bookstore.gpo.gov/collections/ocean_exploration.html

Potomac Highlands Watershed School
The Potomac Highlands Watershed School is a website where students in the Potomac Highlands and the rest of the Chesapeake Bay region can learn about local watershed issues, and teachers can come for educational support with lesson plans and ties to curriculum standards. The interactive website offers separate sections for elementary, middle, and high school students, along with a teacher site linked to activities, educational programs, references, and more.
http://www.cacaponinstitute.org/e_classroom.htm

The Power of Place: Geography for the 21st Century
The Annenberg Channel presents The *Power of Place: Geography for the 21st Century*, to teach the geographic skills and concepts that are necessary to understand the world. Geography educators and content experts from around the globe shed light on the physical, human, political, historical, economic, and cultural factors that affect people

and natural environments. Maps, animation, and academic commentary bring into focus case studies from 50 sites in 36 countries.
http://www.learner.org/resources/series180.html

Power of Story
Master Storyteller Kendall Haven presented *Story: the Language of the Mind* at the ClimateWatch Summer Workshop, describing the science behind the power of story. The presentation can be watched on YouTube (in several parts), and the slides downloaded in pdf format on the NOAA website.
http://www.youtube.com/user/hunterba123#p/c/47CC56A7ABE17D4A/0/I2o34V6cs24
http://www.nodc.noaa.gov/General/NODC-About/Outreach/docs/10/OneNOAAScience_11Aug2010_Haven.pdf

Powers of Ten
Powers of Ten is a film about magnitudes. The companion website offers a visualization expanding by ten time greater magnification, from a proton of a carbon atom within a DNA molecule in a white blood cell to outside our galaxy. Check out the blog.
http://www.powersof10.com/

PowerUp
The 3D action strategy game PowerUp challenges players to save an imaginary planet while learning engineering and science principles by carrying out missions to supply solar, wind, and water power. In addition to the downloadable game, the website offers lesson plans, a teacher's guide, and more.
http://www.powerupthegame.org/

Practical Uses of Math and Science
NASA's Practical Uses of Math And Science (PUMAS) website is a collection of brief examples showing how math and science topics taught in K-12 classes can be used in interesting settings, including every day life. The examples are primarily written by scientists, engineers, and other content experts. A peer-review process stresses originality, accuracy, presentation clarity, and connection to national math and science curriculum guidelines.
https://pumas.gsfc.nasa.gov/

Precipitation Education – Rain EnGAUGE
NASA's Global Precipitation Measurement Mission, Rain EnGAUGE, launches in February 2014. Host a Rain EnGAUGE outreach event with help from these NASA resources, including an electronic toolkit which includes an activities menu, planning schedules, sample advertising flier, and more. The activities menu has a variety of activities to teach about precipitation and its importance to our lives, from hands-on labs to computer interactives, for all age levels.
http://gpm.nasa.gov/education/rain-engauge

PRBO Marine Division
The mission of PRBO's Marine Division is to use science to guide ocean ecosystem protection, conservation, and management. The website features detailed information about our many marine projects. These focus on predators as climate change and habitat quality bio-indicators; population dynamics; life history characteristics seabirds in relation to marine fisheries and pollution; and the creation of marine protected areas and marine reserves to protect ocean ecosystems.

www.PRBO.org/marine

Predicting Seasonal Weather
This special report from the National Science Foundation investigates how atmospheric oscillations play a part in controlling the weather on a seasonal time scale. Sections cover real-time weather forecasts, the creation of a more effective prediction model, and a demonstration of the new model.
http://www.nsf.gov/news/special_reports/autumnwinter/intro.jsp

Predicting the Weather
The Internet Scout Project focuses its Topic in Depth of the NSDL Scout Report for the Physical Sciences newsletter for June 10, 2005 on Predicting the Weather. The listed websites describe the basic tools and knowledge used to create weather forecasts; explore how the weather can impact local communities; provide graphics for five forecast models; and more.
http://scout.wisc.edu/Reports/NSDL/PhysSci/2005/ps-050610-topicindepth.php#1

PreK-8 Environmental Education Activity Guide
Project Learning Tree has released its PreK-8 Environmental Education Activity Guide. There were six main goals addressed with the comprehensive revision: improved reading connections; teacher support for differentiated instruction; assessment techniques; technology connections; content through updated issues, statistics, and facts; and the overall design. Two new activities include *The Global Climat*e and *Invasive Species*.
http://www.plt.org/cms/pages/21_21_10.html

Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments
The Climate Impacts Group offers the on-line Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments, designed to agencies prepare for climate change by recommending a detailed, easy-to-understand process for climate change preparedness based on familiar resources and tools. These steps include creating a climate change preparedness team; identifying community vulnerabilities to climate change; and identifying, selecting, and implementing adaptation options.
http://www.cses.washington.edu/cig/fpt/guidebook.shtml

Preparing to Write Your Strategic Plan
The workbook *Preparing to Write Your Strategic Plan*, part of the suite of social science tools available from the NOAA Coastal Services Center, guides users in gathering the information needed to develop a strong strategic plan. The workbook includes worksheets for organizations to use as they step through this process
http://www.csc.noaa.gov/publications/strategic_planning.html

Preserve America's Waterways
In partnership with several community-based youth organizations, Preserve America's Waterways seeks to generate one million community service hours to protect and preserve the nation's waterways. Visitors to the website can find ideas and guidelines, register their service projects, or find a local project.
http://www.pawaterways.org/index.php

Preserving Ocean Resources
This four page newspaper offers information relating long term ocean health and marine protected areas. Up to 10 copies are available to high school educators who are incorporating MPAs into their curriculum.
Contact christie_anastasia@nps.gov

President's Climate Action Plan Tracker
The Columbia Law School Center for Climate Change Law hosts this web page to help visitors keep track of the President's Climate Action Plan. The links lead to information about each provision in the plan, including the specific goals it sets, related policies, and steps taken to achieve its goals.
http://web.law.columbia.edu/climate-change/resources/presidents-climate-action-plan-tracker

Primer on Climate Change Science
The National Association of Clean Air Agencies has released this brochure that provides an overview of key issues related to climate change science. The primer explains the greenhouse effect, major greenhouse gases and their sources, and more.
http://www.4cleanair.org/Documents/NACAAClimateSciencePrimerpost.pdf

Primer on Hypoxia in the Gulf of Mexico
This product of last year's Hypoxia Coordination Workshop addresses action items and supports the goals and actions of the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force. The primer offers background information about hypoxia, along with its causes and its impacts.
http://www.gulfofmexicoalliance.org/pdfs/Primer_on_Hypoxia_in_the_Gulf_of_Mexico.pdf

A Primer on Invasive Species in Coastal and Marine Waters
What are invasive species? How long have invasive species been around? What changes can invasive species cause? How do invasive species get introduced? What agencies are trying to manage the influx of invasive species? These questions and more are addressed in this publication. The primer includes a glossary, international regulations, expert contact information, educational information links, and more.
http://www.flseagrant.org/program_areas/coastal_habitats/habitats_pm.htm

Prince William's Oily Mess
NOAA's National Ocean Service Communications and Education Division offers the newest Discovery Story entitled *Prince William's Oily Mess: A Tale of Recovery*. Aimed at the high school level, it includes educational materials on the Exxon Valdez oil spill that occurred almost 16 years ago in Prince William Sound, Alaska, and the research conducted since the accident. Included are an oil spill primer, hands-on activity using collected data, oil spill trajectory model, student and teacher guides, quiz, and more.
http://oceanservice.noaa.gov/education/stories/oilymess/welcome.html

Principles for Effective Stakeholder Engagement in Marine Planning – Online
It is essential that marine planning processes are designed to engage stakeholders in a manner that meets the needs of planners, process participants, and the stakeholders themselves. This free virtual training, May 15, 2014, will present and explore principles and best practices for stakeholder engagement in marine planning.
http://openchannels.org/node/6338

Priority Conservation Areas: Baja California to the Bering Sea
The Commission for Environmental Cooperation and the Marine Biology Conservation Institute offer Priority Conservation Areas: Baja California to the Bering Sea, a new book and map that identify 28 aquatic environments which marine experts consider essential to safeguarding the biological diversity of the west coast of North America. The book presents key information regarding the biodiversity, ecological significance and threats found in each area.
http://www.cec.org/pubs_docs/documents/index.cfm?varlan=english&ID=1756

Problem-Based Learning
Based at the University of Delaware, this set of peer-tested and vetted educational resources asks the question: "How can I get my students to think?" Problem-based learning is a method that asks students to work cooperatively in groups in order to seek solutions to real world problems. The website offers sample problem-based learning problems, which include several group exercises that deal with different scenarios from water problems to a case study problem in molecular evolution.
http://www.udel.edu/pbl/

Proceedings from the First International Marine Protected Areas Congress
Proceedings from the First International Marine Protected Areas Congress, held October 2005 in Australia, are now available. The document totals 665 pages and includes abstracts from all congress presentations, as well as full text of the meeting's plenary addresses. A full range of MPA issues is covered, including planning, management, science, and more. The file, 19 MB in size, is searchable by author, keyword, theme, and other criteria. It also includes a list of delegates with e-mail contact information.
http://www.impacongress.org/proceedings.htm

Probing the Impact of Climate Change on Wildlife, Ecosystems
NASA and partners have initiated new research and applications efforts that will bring the global view of climate from space down to Earth to benefit wildlife and key ecosystems through research investigating the intersection of climate and biological studies. Check out some of the links to project websites.
http://www.nasa.gov/topics/earth/features/climate_partners.html

Professional Development Guidelines for Environmental Education
Developed by the National Project for Excellence in Environmental Education, the recently revised "Guidelines for the Preparation and Professional development of Environmental Educators" is a resource to help you design and implement effective high-quality EE professional development programs.
www.naaee.org/npeee

Project 3D-VIEW
Project 3D-VIEW (Virtual Interactive Environmental Worlds), designed and developed by U.S. Satellite Laboratory, Inc., is a NASA-funded, curriculum-based program for Grades 5 and 6. Students engage in simple-to-use, immersive 3D technologies with 3D imagery and animations, and learn standards-based concepts and practice inquiry in lithosphere, biosphere, hydrosphere, atmosphere, and Earth systems.
http://www.3dview.org

Project Archaeology
Project Archaeology uses archaeological inquiry to foster understanding of past and present cultures; improve social studies and science education; and enhance citizenship education to help preserve our archaeological legacy. The project offers publications, professional development for educators, networking opportunities, and continuing support for participants, teaching scientific inquiry, citizenship, personal ethics and character, and cultural understanding. Project Archaeology operates through a network of state programs.
http://www.projectarchaeology.org/

Project AWARE Teachers Guide
The Project AWARE Foundation conserves underwater environments through education, advocacy and action. The Foundation funds projects that have a direct benefit to the aquatic environment such as public education, grassroots conservation projects, volunteer-supported community activism, and more. The website highlights wreck awareness through Respect Our Wrecks, including on-line public service announcements, a downloadable Aware Kids teacher's guide, grants, and more.
http://www.projectaware.org/

Project-Based Learning Newsletter
Project-Based Learning is a weekly resource for tools and information published by The George Lucas Educational Foundation. Each issue features original stories, as well as links to relevant news features, with a special focus on how K-12 students explore real-world problems, leading to a deeper knowledge of subject matter, greater motivation, and improved research and problem-solving skills. Issues in May explored a watershed project and a fish hatchery project.
http://www.edutopia.org/php/keyword.php?id=037

Project-Based Learning Research: Evidence-Based Components of Success
There are critical elements to consider when applying project-based learning in the classroom. Edutopia offers research-proven steps from project design through structured student collaboration to assessment. The web page also offers links to additional resources.
http://www.edutopia.org/pbl-research-evidence-based-components

Project-Based Learning Resources
Edutopia offers these free resources and tools for project-based learning. Check out the ten takeaway tips, assessment tools, sample projects, and more.
http://www.edutopia.org/stw-replicating-pbl-resources

Project BudBurst 2009
Project BudBurst will officially launch the 2009 national field campaign for students, families and other volunteers on March 2, 2009. The project is designed to engage the public in the collection of important climate change data based on the timing of leafing and flowering of trees and flowers. New website features include field guides to phenophases, updated plant species Identification Guides, real-time mapping with Google Maps, new classroom resources, photo sharing of plant observations, and more.
http://www.windows.ucar.edu/citizen_science/budburst/

Project Budburst
Project BudBurst is a campaign of the National Phenology Network for citizen scientists. It is designed to engage the public in the collection of important climate change data based on the timing of leafing and flowering of trees and flowers. BudBurst participants take careful observations of the phenological events and the observations and records are reported into the BudBurst data base. The website offers an activity guides, teacher guides, data sheets, and more.
http://www.windows.ucar.edu/citizen_science/budburst/

Project CONVERGE
Scientists will be living at Palmer Station, Antarctica through mid February 2015, to study the food chain that supports everything from phytoplankton to penguins. The project is designed to help students virtually engage with scientist as they conduct research, ask science questions, analyze and interpret data, and plan and carry out their science investigations. Read the daily project blog, Ask a Question, and more.
http://coseenow.net/converge/

Project Dolphin Campaign
NOAA Fisheries Office of Protected Resources has developed educational materials about the dangers of feeding and otherwise closely interacting with wild dolphins, including brochures, posters, warning signs, and public service announcements.
jill.lewandowski@noaa.gov

Project Earth
Created by Ecology and Environment, Inc. as an environmental education resource for U.S. and international K-12 schools, Project Earth is a networking site that encourages the exchange of ideas between students across the world on a variety of sustainability and environmental topics and solutions. Participants can post projects on the website and projects can be searched by category, grade level, key word, location, and user type. Check out the contest section, sign up for project news, and more.
http://www.projectearth.net

Project Evaluation Website Updated
The National Marine Sanctuary's California B-WET Program has completed the second phase of the Education Project Evaluation website. The website includes information on how to plan, design, implement, and report on evaluation of your education project, along an evaluation overview and links to helpful resources
http://sanctuaries.noaa.gov/education/evaluation/welcome.html

Project FeederWatch
Those interested in citizen science can join the thousands of FeederWatchers across North America who count the birds at their feeders from November through early April. All participants receive the project's annual summary publication and the Cornell Lab's quarterly. New project participants receive a bird-identification poster, bird-feeding information, and instructional materials. Count feeder birds for science during the 2014-15 Project FeederWatch season, November 8, 2014 through April 3, 2015.
http://feederwatch.org/join-or-renew/
https://store.birds.cornell.edu/Project_FeederWatch_s/42.htm

Project Kaisei
Project Kaisei will examine the largest area of the Plastic Vortex, an ocean gyre situated to the northeast of Hawaii, to collect and study plastic and other marine debris in order to showcase some of the new technologies that may be used for processing and recycling. Expected departure dates are August 2, 2009 for *The New Horizon* from San Diego, and August 4, 2009 for the *Kaisei* from San Francisco. Sign up to follow the expedition online, and check out the website for background information.
http://www.projectkaisei.org/

Project Look Sharp
Project Look Sharp, a media literacy initiative at Ithaca College, provides free classroom-ready curriculum materials for integrating critical thinking and media literacy into environmental studies and science curricula. Environment Curriculum Kits include Chemicals in the Environment, Endangered Species, Resource Depletion, and Global Warming. The materials can be downloaded from the website.
http://www.ithaca.edu/looksharp/

Project Noah
Project Noah is an online and mobile location-based application that encourages people to reconnect with nature by documenting local wildlife. The tool harnesses the power of smart phones to collect ecological data and help preserve global biodiversity.
http://www.projectnoah.org/

Project Oceanica
The College of Charleston's Project Oceanica's goal is to integrate education with oceanographic research and exploration, and to develop educational resources and programs available to college and high school students and K-12 educators. The website offers links to research cruise multimedia, hands-on activities for plate tectonics, the downloadable mini-text *Of Sand and Sea*, echinoderm galleries, and more.
http://oceanica.cofc.edu/

Project Oceanica
Project Oceanica continues to add new features to their website, including Fish Watch and Shelf Edge Reefs. Check out the Transects Program, designed to immerse undergraduate and graduate students in oceanographic research by taking them to sea to collect biological and geological samples and later analyze the data in the laboratory. Transects is funded for two years, and a total of four 5-day research cruises and follow-up oceanographic research courses will be offered over the 2 year project.
http://oceanica.cofc.edu/home.htm .

Project PHAEDRA 2006
NOAA's Ocean Explorer website offers archived information about the Partnership for Hellenic/American Exploration in the Deep Regions of the Aegean (PHAEDRA), the second season of a multi-year Greek-American ocean research partnership. An international team of engineers, geologists, geochemists, archaeologists, and historians embarked on the Greek research vessel Aegaeo to explore deep sites within Greek national waters.
http://www.oceanexplorer.noaa.gov/explorations/06greece/welcome.html

Project POWER
The New York Aquarium launched Project POWER, a national training seminar sponsored by the EPA with support from the New York State Department of Environmental Conservation. Participants represented 13 states with regulators from a broad range of agencies. The project stresses the need for a commitment to public education to protect our national wetland heritage and infuse marine science and wetlands conservation not only into a school's curriculum, but also into a community's curriculum. Project POWER is working to create the beginnings of a national network of state agency-environmental center partnerships with the capacity to provide educational workshops to wetland violators as well as to community members who live in environmentally sensitive areas so that violations can be avoided before they occur. Contact Merryl Kafka at mkafka@wcs.org

Project SeaCAMEL
On November 12-14, 2007, a special coral-reef research and education project will be taking place 20 meters below the sea surface in the underwater laboratory, Aquarius, studying corals and sponges on Conch Reef in the Florida Keys National Marine Sanctuary. The research will be broadcast live from Aquarius via the Internet, along with six classroom modules, each covering a different topic of coral reef sciences to classrooms of all levels all over the world.
http://www.marine-ed.org/bridge/index_seacamel.html

Project SeaCAMEL
Project SeaCAMEL (Classroom Aquarius Marine Education Live) is planned as the first in a series of "sea to shore" education missions planned by the Living Oceans Foundation, November 12-14, 2007. An underwater video crew from project partner Media Arts, Inc. will document the action in and around Aquarius, while project partner Immersion Presents will direct-link the SeaCAMEL mission ashore via satellite and the Internet, and will produce a multimedia science education and outreach program.
http://www.livingoceansfoundation.org

Project Shark Awareness
The Florida Museum of Natural History presents Project Shark Awareness, shark education and outreach programming for educators. This outreach program is created to educate the public about the myths and realities of shark biology, behavior, and conservation. The targeted audience consists primarily of students at middle schools, high schools, youth organizations, and environmental centers. The project has also received funding to hold professional development workshops.
http://www.flmnh.ufl.edu/fish/education/psa/psa.htm .

Project WILD Science and Civics: Sustaining Wildlife Curriculum
Project WILD's high school curriculum is designed to serve as a guide for involving students in environmental action projects aimed at benefiting the local wildlife found in a community. It involves young people in decisions affecting people, wildlife, and their shared habitat in the community. The program consists of four major components: awareness, participatory democracy, habitat exploration and taking action.
http://www.projectwild.org/materials/science_and_civics/science_and_civics.htm

Promise of Place
The Promise of Place website is a project of the Center for Place-based Learning and Community Engagement and is supported by the USDA Forest Service. It offers

program ideas, case studies, research, links, and other resources to support place-based education projects. The Planning Tools section of the Resources and Curriculum offers tools and exercises; curriculum and other sections are being populated.
http://www.promiseofplace.org/

Protect Planet Ocean
The Protect Planet Ocean website aims to bring the best information on marine protected areas, including basic facts on each of nearly 5000 MPAs worldwide; the ability to upload information; discussions of the science of no-take marine reserves; multimedia content on MPAs; and more. *Oceans Live* offers live video from an underwater camera inside Glover's Reef Atoll World Heritage Area. The website also hosts The Official MPA Blog and MPA-related headlines from newspapers worldwide.
http://www.protectplanetocean.org/

Protect Your Climate Curriculum
The (California) Bay Area Air Quality Management District offers Protect Your Climate, a comprehensive climate protection curriculum with 16 lessons for grades 4-5, which can be easily adapted for other grades. The lessons investigate the science and causes of climate change and how students can take action to protect our climate through hands-on activities.
http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Climate%20Protection%20Program/protectyourclimate.ashx

Protected Area Governance and Management
The IUCN offers this 1000-page book covering protected area governance and management. It combines original text, case studies from across the world, and scientific literature. Contributors included five editors, 164 principal and supporting authors, and 27 peer reviewers over a period of two and a half years. It is available as a free download and will be available in print.
http://press.anu.edu.au/titles/protected-area-governance-and-management/attachment/b-thumb-protectedarea/

Protected Area Tools
This section of the ConserveOnline website contains information, tools, and resources to help practitioners perform a variety of ecological, management, policy, and financial assessments that can contribute to an overall protected area system master plan. Materials include Marine Gap Assessment Quick Guide, Protected area systems monitoring, and more. While you're on the website, browse the library by subject category, including natural heritage programs, public education, and more.
http://conserveonline.org/workspaces/patools

Protected Area of the Week
The World Commission on Protected Areas (WCPA) and the Protected Area Programme (PPA) of the IUCN has launched a new initiative promoting protected areas worldwide as the best places on earth. Each week a different protected area from a different region and representing a different biome will be featured on the homepage of IUCN website, the WCPA website, on twitter, and igoogle.
http://www.iucn.org/about/work/programmes/pa/pa_paday/

Protected Areas Financing Publications
The following two publications can be resources for protected areas financing: *Rapid Review of Conservation Trust Funds*, prepared for the CFA Working Group on Environmental Funds by Barry Spergel and Philippe Taïeb; and *Raising Revenues for Protected Areas: A Menu of Options*, World Wildlife Fund, Barry Spergel,
http://www.fmcn.org/documentos/RapidReviewCTFsMay08Final.pdf
http://www.conservation.org/sites/gcf/Documents/raising_revenues_pa.pdf

Protected Areas Management Effectiveness Information Module
The Protected Areas Management Effectiveness Information Module contains information on protected areas management effectiveness. The module is linked to the World Database on Protected Areas, which allow users to obtain further information about the protected areas assessed. It also provides a space for users to submit information on management effectiveness methodologies and assessments as well as obtain further information on experts, publications, and links to related information.
http://www.unep-wcmc.org/wdpa/mehttp://www.unep-wcmc.org/wdpa/me

Protected Areas: Natural Solutions to Climate Change Crisis
The book, Natural Solutions: Protected Areas Helping People Cope with Climate Change, articulates how protected areas contribute significantly to reducing the impacts of climate change and what's needed for them to achieve even more. It is available for download from the website.
http://www.iucn.org/?4329/Protected-areas--natural-solutions-to-climate-change-crisis

Protected Planet
The United Nations Environment Programme (UNEP) has joined forces with the International Union for the Conservation of Nature (IUCN) to create protectedplanet.net, an interactive, social media-based website that aims to provide information on both widely known and lesser known protected places in the world. Using the latest satellite images, users can pinpoint individual protected areas, such as national parks or marine reserves, and zoom in for information on endangered species, native plant life, or terrain.
http://www.protectedplanet.net/

Protected Planet News
IUCN's Protected Planet offers a monthly newsletter. The July newsletter, which will be posted online soon, focuses on marine issues. The June 2014 issue focused on World Heritage and Oceania, while previous ones explored Europe and wetlands, Meso America, and more.
http://www.iucn.org/about/work/programmes/gpap_home/gpap_news/wcpa_gpapnewsletters/

Protected Resources Education
The Office of Protected Resources works in cooperation with NOAA Fisheries Regions and Science Centers to provide educational experiences and materials for students, education professionals, and the public about the conservation and protection of marine species. The website includes links for kids to a variety of projects, activities, and information, including *The Kid's Times* about whales and turtles. There are also downloadable lesson plans and guidelines for responsible wildlife viewing.
http://www.nmfs.noaa.gov/pr/education/

Protecting our Diverse Heritage: The Role of Parks, Protected Areas, and Cultural Sites
These proceedings of the joint George Wright Society Biennial Conference/National Park Service Cultural Resources 2003 conference focus on parks, protected areas, and cultural sites. Categories of papers include: Administrative and Intellectual Tools for Park Management; Basic Values and Purposes of Parks; Cultural and Natural Resources: Conflicts and Opportunities for Cooperation; and more. The individual papers can be downloaded from the website. For more information, check out http://www.georgewright.org/2003proc.html .

Protecting Water Resources with Smart Growth
The EPA offers Protecting Water Resources with Smart Growth, intended for audiences already familiar with smart growth, seeking more ideas on how to protect their water resources. The document describes how communities and local governments have used smart growth practices to minimize impacts of new development on their water resources. Education sections describe how communities or local governments engage in activities such as water quality education, model town demonstrations, and more. http://www.epa.gov/smartgrowth/water_resource.htm

Psychology of Climate Change Communication
The Center for Research on Environmental Decisions at Columbia University offers the online Psychology of Climate Change Communication. The guide is available in its entirety on the website, by individual chapter or as the complete guide. http://cred.columbia.edu/guide/index.html

Public Lands Day
On September 29, 2007, lend a hand for the 14th annual coast-to-coast effort to clean up public lands to help preserve America's lands. The focus this year will be on countering the tide of invasive species taking over habitats and native species. http://www.publiclandsday.org/

Publications Catalog – University of Delaware Sea Grant
This online catalog is designed to inform browsers of the wealth of publications and videos available from the University of Delaware Sea Grant College Program. Categories include Children's Activities, Hot Topic Fact Sheets, On-Line Expeditions, Videos, and more. Some are available for free downloading, others may be ordered. http://www.ocean.udel.edu/seagrant/publications/pubcatalog.html

Publications on MMAs
The Science-to-Action partnership offers recommendations for successful implementation of marine managed areas (MMAs) to maximize the benefits to people and nature. Three new booklets draw on the results of more than 50 studies: *People and Oceans, Living with the Sea,* and *Marine Managed Areas: What, Why, and Where*. http://www.science2action.org/

Public/Private Reef Conservation Campaign in Hawaii
The National Fish and Wildlife Foundation and partners has joined with Tesoro Corporation in developing a coral reef conservation program in Hawai'i that includes a public school curriculum and a community awareness campaign. The program is designed to support coral reef conservation and community projects.

http://www.honoluluadvertiser.com/apps/pbcs.dll/article?AID=/20080622/NEWS11/806220343/1021/LOCALNEWSFRONT

Pubpeer
This website provides scientists with an ability to submit objective review/comments on a published paper. The authors of the paper will be contacted along with up to 100 scientists within the field and whomever reads it to make comments. The comments are permanently linked to the paper when found on the web, and therefore pressure to address problems with the paper and/or journal/editor will always be there.
https://pubpeer.com/

Pulse of the Planets' Educator Resources
The National Science Foundation's Pulse of the Planet offers lesson plans using Pulse of the Planet programs and sounds as a focus for learning activities on a variety of subjects. The lesson plans are aligned to national science education standards for grades K - 12. All lesson plans, along with downloadable audio files, are free for educational use; free registration is required.
http://pulseplanet.com/educatorresources/

Putting Time In Perspective
These timelines represent the history of time, initially from a human view, as a series of growing timeline. Each timeline contains all the previous timelines (colors will help you see which timelines are which). Note that this is from a very informal blog – a link at the end of the article will take you to a less informal time series.
http://waitbutwhy.com/2013/08/putting-time-in-perspective.html

Q?rius
Q?rius is an interactive space in a learning lab located on the first floor of Smithsonian's National Museum of Natural History. Visitors are invited to be an active and contributing part of the lab. The website offers access to current and archived webcasts, teachers guide, activities, and more.
http://qrius.si.edu/

QUAD: Surfrider Foundation Youth School Clubs
Surfrider Foundation offers Quad, a program and website dedicated to support students who wish to become more involved in Surfrider Foundation's activities on their campuses and in their communities. The program supports students organizing a club or individual project and offers a media platform to communicate awareness of their beach, ocean, or plastic issues. The website highlights ongoing club projects and offers a conservation-related blog with information about projects, grants, and more.
http://www.surfrider.org/quad

Quahog Dissection
This Rhode Island Sea Grant informational page presents a descriptive guide to Quahog dissections. The page accompanies students performing the clam dissection, using colorful images and highlighted vocabulary terms to illustrate special features. In addition to general anatomy, the reference includes informational sections about feeding and digestion, and respiration and circulation. Linked terms direct users to related Sea Grant web pages.
http://seagrant.gso.uri.edu/G_Bay/HabitatEco/Shellfishing/quahog_dissect.html

Queen Anne's Revenge
North Carolina Department of Cultural Resources offers *Queen Anne's Revenge: Investigating, Interpreting & Preserving the Remains of Blackbeard's Flagship*. This website includes sections on archaeology, artifacts, conservation, education, and more.
http://www.qaronline.org/

QUEST
A collaboration of six public broadcasters around the country, QUEST is a multimedia series covering sustainability topics through articles, videos, radio reports, television broadcasts, and educational materials. Topics include water, biodiversity, climate, and more.
http://science.kqed.org/quest/curriculum/

Quick Guide to Conducting Marine Ecological Gap Assessments
Published by The Nature Conservancy, *A Quick Guide to Conducting Marine Ecological Gap Assessments* offers advice on analyzing gaps in conservation coverage for use in planning marine protected area networks. Featuring brief case studies from four nations (Ecuador, Grenada, Jamaica, and Palau) and best practices learned to date, the guide serves as an introduction and overview to ecological gap analyses.
http://conserveonline.org/workspaces/patools/resources/gapassessment/gapdocs/marinegapquickguide

QuikSCience Challenge Lessons
The QuikSCience Challenge for students in California and Hawai'i is a competition for teams of middle and high school students who create projects and portfolios on a science subject related to marine or freshwater environments. Recent website updates include additional lesson plans from 2010 winners, including *Runoff*.
http://www.usc.edu/org/quikscience/

QuikSCience Lesson Plans
The University of Southern California, Wrigley Institute for Environmental Studies, and Quiksilver Foundation offer downloadable lesson plans from the QuikSCience Challenge. Topics include global warming, marine pollution, and more.
http://www.usc.edu/org/cosee-west/quikscience/lesson_plans.html

Quizlet
Quizlet allows users to create flashcard sets with little fuss, and also share flashcards with friends via email, Facebook, or MySpace.
http://quizlet.com/

Race Around the World
The 2008-2009 Volvo Ocean Race education website, sponsored by Sail Newport and St. Michael's Country Day School, offers middle school students and teachers the opportunity to virtually race around the world with seven Volvo Ocean Race teams as they circumnavigate the globe. Track these teams while learning geography, marine science, math, history, physical science, and more. The website will be updated regularly, and currently offers activities for students, lesson plans, and more.
http://www.globallearning-sailnewport.org/

Race 4 Birds Birding Competitions for Young People
The Race 4 Birds Foundation promotes youth birding competitions. The website offers a planning guide, resources, and more.
http://www.race4birds.org

Rachel Carson Estuary Live
The Rachel Carson Component of the North Carolina National Estuarine Research Reserve site held their Estuary Live on September 21-22, 2004. The sessions were aligned with the North Carolina Science Standards will covered general estuary information, cephalopods, fouling communities, sustainable seafood, boating, and reptiles.
www.estuarylive.org .

Rachel Carson Online Book Club and Intergenerational Contest
Tthe Friends of the National Conservation Training Center has launched the Rachel Carson Online Book Club. Continuing through November 2007, the book club will focus on the life and work of Rachel Carson including her role as a female leader in science and government. Each month features distinguished guest moderators who will share insights and comments on the text.

The Intergenerational Contest Honoring Rachel Carson is a photo, essay, and poetry contest in honor of Rachel Carson sponsored by the EPA Aging Initiative, Generations United, and the Rachel Carson Council, Inc. The project must involve a person under age 18 and a person age 50 or older.
http://rcbookclub.blogspot.com/
http://www.epa.gov/aging/resources/thesenseofwonder/index.htm

Rainbow Series
The Joint Fire Science Program funds scientific research on wildland fires and distributes results to help policymakers, fire managers, and practitioners make sound decisions. The Rainbow Series offers five documents about Wildland Fire in Ecosystems, detailing the effects of fire on flora, soil and water, fauna, air, and cultural resources and archaeology.
http://www.firescience.gov/JFSP_rainbow_series.cfm

Raising Your Water IQ
The Texas Water Development Board designed this learning resource to help K-6 students become more water wise. The site includes a series of interactive website modules, a 6th grade curriculum, and a K-3 coloring book with original Texas-centric characters.
http://www.twdb.state.tx.us/kids/

RAMP Cruise 2009
The Reef Assessment and Monitoring Program cruise to the Papahānaumokuākea Marine National Monument has begun aboard the NOAA ship *Hi'ialakai*. Scientists will revisit numerous sites around the remote islands and atolls to gather data on reef ecosystem health. Follow the mission through cruise logs, check out the crew biographies, and more.
http://sanctuaries.noaa.gov/missions/2009ramp/

Ramsar Site Database
The Ramsar Sites Database is now online. Wetlands International manages and develops the database. A search facility now makes it possible to find one or more Ramsar sites by selecting on nearly any combination of criteria, including wetland type or land use, designation date, and others.
http://www.wetlands.org/RSDB/default.htm .

Ramsar 'Toolkit', second edition (2004)
The 14-volume Ramsar Convention Handbooks for the Conservation and Wise Use of Wetlands, 2nd edition, is available for downloading. The Convention promotes an integrated package of actions to ensure the conservation and wise use of wetlands. The handbooks incorporate the guidelines, relevant material from other sources, and case studies designed to illustrate key aspects of the guidelines. Most of the full case studies can be found on the website of the Convention (http://ramsar.org/wurc_index.htm).
http://ramsar.org/lib_handbooks_e.htm .

Ramsar Video
The 22-minute Ramsar video, available in English, French, and Spanish, offers an introduction to the problems facing wetlands everywhere and focuses upon international case studies. For easier downloading, "Save Target As" (Microsoft Internet Explorer) or "Save Link Target As" (Netscape) and save the whole film to your hard disk, then launch.
http://www.ramsar.org/wwd2003_index.htm#offer

Rapid Assessment Protocols For Small Vessel Groundings
This paper discusses assessing impacts from small vessel groundings in coral or seagrass habitats. A series of 2-3 page protocols has been developed to provide guidance on collection of key ephemeral data after small vessel groundings, particularly where resources are limited and access is difficult.
Contact jmichel@researchplanning.com

Rare Earthtones - Endangered Species Ringtones
The Center for Biological Diversity offers free endangered species ringtones and phone wallpapers, a collection of high-quality, authentic sounds and images of some of the world's most threatened birds, owls, frogs, toads, and marine mammals. Cell phone users - check this one out!
http://www.rareearthtones.org/ringtones/

Rare: Inspiring Conservation
The RARE Center for Tropical Conservation has pioneered innovative approaches to achieving conservation results through community-based education. Rare supports hundreds of grassroots conservationists around the world each year, providing them with training, technical support, and resources. Its Pride campaign bridges the gap between the scientific realm and the daily lives of local people through social marketing techniques, making conservation messages relevant to the local community.
http://www.rarecenter.org/ .

Rating Islands
The National Geographic Center for Sustainable Destinations, in collaboration with George Washington University, conducted a Destination Scorecard survey. A panel of 522 experts in sustainable tourism and destination stewardship review conditions in 111

selected islands and archipelagos. The scores reflect the experts' opinions and the website offers quoted phrases from their remarks which suggest the thinking behind the scores.
http://www.nationalgeographic.com/traveler/features/islandsrated0711/islands.html

Ravenswood Media
Ravenswood Media produces natural history and social documentaries. They have pioneered a new Internet genre called the "webumentary". The webumentary conforms the documentary format into an online non-linear program by posting streaming digital video on the web. They offer nature, wildlife, environmental, and science video productions. Check out their web offerings on invasives, frogs, and more.
http://www.ravenswoodmedia.com/

Reach
US Sailing's Reach program engages youth and enhances career opportunities in the fields of STEM and Environmental Stewardship through learning experiences. The program uses sailing as an educational platform, challenging youth to embrace education, establish a love of learning, and explore productive STEM-based careers. Preview the educator guide and check out upcoming course and opportunities.
http://reach.ussailing.org/

REACH Program
US Sailing offers the REACH Program, an initiative that utilizes sailing as a platform that enables middle school aged youth to embrace education, establish a love of learning, and explore productive STEM based careers. The REACH program connects educators, sailing instructors, engineers, and scientists with youth to provide students the opportunity to apply classroom learning in a cooperative work environment. The downloadable curriculum includes lesson plans that range from wind to marine science.
http://reach.ussailing.org/index.php/curriculum/

Reach the World
Reach the World is a nonprofit educational media developer and a provider of schoolbased training in instructional technologies. Its mission is to link students and teachers in low-income communities with real-world, global expeditions that have the power to expand learning beyond the classroom. Follow the voyage of the Makulu, as the trade winds carry her across the Atlantic Ocean towards Barbados in the Caribbean Sea. Check out the materials in the Floating Classroom.
http://reachtheworld.org/ .

Reaching Out to Latino Audiences
Educators are working to find ways to reach youth and adults in the U.S. from diverse backgrounds. Check out this program from Environment for the Americas, using an Outreach Toolkit and multilingual activities for teaching about birds.
www.birdday.org/connectingcultures/connecting-cultures-study
http://www.birdday.org/component/sitepages/?id=86

Real Climate: Data Sources
Part of the Guardian Environment Network, this website hosts articles, links to data sources, and more about global climate. Links include raw or processed climate data, paleo reconstructions, models, and more. The "Start Here" button takes users to articles divided by level of expertise, from beginners to informed but in need of more detail.

http://www.realclimate.org/index.php/data-sources/

Real-time Data Resources from Ocean Observing Systems
This resource list of over 70 annotated web sites was developed as part of a national focus group study of K-12 educators who currently use real-time data in their classrooms. This list focuses on ocean-related datasets, but also includes weather and watershed resources. A Real-time Data Educators Mailing List is also available for subscribers at https://email.rutgers.edu/mailman/listinfo/rtd_educators.
http://marine.rutgers.edu/outreach/rtd/resources.htm

RealClimate
RealClimate is a commentary site on climate science by working climate scientists for the interested public and journalists. Their aim is to provide a quick response to developing stories and provide the context sometimes missing in mainstream commentary. The discussion on the website is restricted to scientific topics and will not involve political or economic implications of the science.
http://www.realclimate.org/

RealOceans
The Nicholas Institute for Environmental Policy Solutions' Ocean Program offers the website, RealOceans.org, to provide straightforward and concise information on ocean issues that can be used by policy makers, activists, researchers, and educators. The first project is the Ocean Ecosystem Based Management Knowledge Base.
http://realoceans.org/

Recent Earthquake Teachable Moments
Incorporated Research Institutions for Seismology (IRIS) is a consortium of U.S. universities dedicated to the operation of science facilities for the acquisition, management, and distribution of seismological data. The website hosts links to earthquake resources, animations and visualizations, and more.
http://www.iris.edu/hq/retm

Reconstructing the Past Climate of Central Alaska
Join PolarTREC teacher Ken Williams and researcher Seth Campbell and team on an expedition to the slopes of Mt. Denali in central Alaska. The goal of the team's research is to develop a past climate and precipitation record of central Alaska over the past 1000 years. Check out the journals, photos, and more.
http://www.polartrec.com/expeditions/reconstructing-the-past-climate-of-central-alaska

Recreational Trails Program Database
The goal of the Recreational Trails Program Database project is to provide a central repository for national trail project data. The database hosts information about more than 20,000 trails.
http://recreationaltrailsinfo.org/

Recreational Visitor Diversity
The United States Forest Service has recently issued two social-science reports on culturally diverse recreational visitors to national forests. Many such visitors are from urban areas; they include immigrants and others who have come from places with very different natural environments and attitudes toward nature. The reports, *Recreation*

visitor research: Studies of diversity and *Serving culturally diverse visitors to forests in California: A resource guid,* are available online.
http://www.fs.fed.us/psw/publications/documents/psw_gtr210/
http://www.fs.fed.us/psw/publications/documents/psw_gtr222/

Recreation.gov
Recreation.gov is a one-stop shop for trip planning, information sharing, and reservations from 12 participating federal partners, including the National Park Service, Fish and Wildlife Service, and more. Search by map or activity.
http://www.recreation.gov/

Recycling Revved Up
ScrapHouse was a temporary demonstration home built entirely of salvaged material on Civic Center Plaza, adjacent to San Francisco City Hall. You can watch the streaming video about the project from this website.
http://greenplanetfilms.org/product_info.php?products_id=677

Red List of Threatened Species
The latest update of the IUCN Red List of Threatened Species, the authoritative source of information on the status of plants and animals, will be released on May 4, 2006. This publication is one of the key tools used to determine the status of the Earth's biodiversity. A major new element since the last update in 2004 is the inclusion of many freshwater and marine species, notably sharks and rays, for the first time.
http://www.iucn.org/themes/ssc/redlists/techdocs.htm

Rediscovering Cordell Bank
For the first time since the designation of the Cordell Bank National Marine Sanctuary in 1989, from October 6-11, 2010, technical scientific SCUBA divers will revisit the shallowest parts of Cordell Bank's reef crest from the research vessel *Fulmar*. Check out the mission blogs and more.
http://sanctuaries.noaa.gov/missions/2010reefcrest/welcome.html

Reef Encounter
The International Society for Reef Studies is making an electronic version of the society's news journal *Reef Encounter* available for free to non-members. A pdf file of the latest edition can be downloaded from the society's membership server.
http://www.coralreefs.org/reef-encounter.htm
http://www.sgmeet.com/isrs/membership/files/REEF-ENCOUNTER-29-1-Feb2014.pdf

Reef Education Network
The Reef Education Network website from the University of Sydney and Tech Talk Australia offers background information about coral reefs, including origins, design, energy cycles, plants, animals, research, management, a glossary, and more.
http://www.reef.edu.au/default.htm

Reef Encounter On-Line Game
The SpielByWeb website provides a way for people to play various strategy games on the web. One of the offerings is Reef Encounter, whose aim is to grow the largest and strongest corals on the reef and then to feed these to your parrotfish in the brief time available. Points are awarded at the end of the game for the number and type of polyps that your parrotfish has consumed. Extensive rules are provided. A similar board game

is also available for purchase at
http://www.zmangames.com/boardgames/reef_encounter.htm.
http://www.spielbyweb.com/

Reef Environmental Education Foundation
The Reef Environmental Education Foundation (REEF) was founded out of growing concern about the health of the marine environment, and the desire to provide the scuba diving community a way to contribute to the understanding and protection of marine populations. REEF has numerous programs and projects. Two of the main programs are the REEF Fish Survey Project and REEF's Field Station Program that includes the organization's latest initiative, the Non-Profit/Academic Field Station Program.
www.reef.org .

Reef Fest
Reef Fest is billed as a whole lot of music festivals throughout Florida and the Caribbean raising support for music education and coral reef conservation. The concept is founded on the principle that everybody loves music, and this offers a chance to find enjoyment in actually doing something people can identify with in the service of the threatened coral reefs that surround, protect, and bring income to their Caribbean country and way of life.
http://www.reeffest.org./

Reef Fish Guide (for the responsible aquarium hobbyist)
The goal of Reef Protection International's Reef Fish Guide program is to increase public awareness about the ethical implications of keeping coral reef fish as pets and provide those entering the hobby, as well as existing hobbyists, with the knowledge to make informed buying choices that contribute to coral reef conservation. The downloadable, one-page guide ranks popular fish species according to several categories, assigning fish into "Take it Home" (recommended) and "Keep it Wild" (avoid) lists.
http://www.reefprotect.org/fish_guide.htm#

Reef Fish Identification
REEF now offers their popular reef fish identification classroom course into a home study DVD course package for beginning fishwatchers in the Caribbean, Florida, and Bahamas. *Reef Fish Identification – A Beginning Course* teaches the basics of fishwatching, including identification of 50 commonly sighted species found in Florida and the Caribbean. A waterproof fish identification booklet, underwater REEF survey slate, and REEF survey materials are included.
http://www.reef.org/node/3106

REEF Fish Survey Project Tutorial
The Reef Environmental Education Foundation (REEF) offers an online resource in English or Spanish for those who would like to conduct or teach REEF Fish ID and surveys. The REEF Tutorial emphasizes carrying out the survey, including the paperwork.
http://www.reef.org/education/REEF_tutorial_eng
http://www.reef.org/education/REEF_tutorial_esp

A Reef Manager's Guide to Coral Bleaching
The report, *A Reef Manager's Guide to Coral Bleaching*, offers reef managers information that can maximize the resilience of reefs to coral bleaching. The guide provides information on the causes and consequences of coral bleaching along with

management strategies to help local and regional reef managers reduce bleaching threats to coral reef ecosystems. The downloadable report includes contributions from over 50 experts in coral bleaching and coral reef management from 30 organizations.
http://www.coris.noaa.gov/activities/reef_managers_guide/welcome.html

Reef Relief Founders
Reef Relief founders Craig and DeeVon Quirolo offer an online resource on coral reefs assembled during their work over the past 23 years in the Florida Keys and the Caribbean. The website hosts educational resources, images, multimedia, and more.
http://www.reefrelieffounders.com/

Reef Relief Founders Educational Materials
The Reef Relief Founders.com website offers numerous educational resources, images, multimedia, and more. Check out the downloadable *Coral Reef Teachers Guide* and many other resources.
http://www.reefrelieffounders.com/

Reef Reminiscences
The United Nations University Institute for Water, Environment & Health has released a 35-page brochure, *Reef Reminiscences: Ratcheting back the shifted baselines*, with a series of reminiscences by the older generation of coral reef scientists, about particular times and places, reminding readers what reefs used to be.
http://www.inweh.unu.edu/Coastal/Publications.htm

Reef Resilience Toolkit
The Reef Resilience Toolkit provides information, guidance, and resources to help managers address the impacts of climate change and local threats to coral reefs. The website provides a suite of training and knowledge-sharing resources and include coral reef science and management methods, making relevant science accessible to managers, and highlighting challenges and solutions for coral reef managers. The website also offers access to a webinar series, publications, case studies, and more.
http://www.reefresilience.org/

Reef Scenarios
Reef Scenarios is an online portal that enables users to access and use the simulation model Coral Reef Scenario Evaluation Tool (CORSET) to explore coral reef futures at regional scales. CORSET is a generic, biophysical model for coral reef systems which couples dynamics from local to regional scales. Interactions between benthic and consumer functional groups at local scales are linked across regional scales by larval dispersal.
https://reefscenarios.org/About

REEF Survey Data Entry Program
The free REEF Survey Data Entry Program allows REEF volunteers to enter survey data on a computer even if an Internet connection is not always available. As surveys are completed, they are marked for upload. When an Internet connection is available, the completed surveys can be uploaded all at once.
http://www.reef.org/dataentryprogram

Reef Survey Report with Links in Google Earth
The Australian Institute of Marine Science long term monitoring survey updates can now be viewed in Google Earth (Version 4), allowing you to zoom to each surveyed reef and view geo-referenced underwater photos and information from previous surveys. Using links to the reef pages, you can also view enlarged photos and a description of the reef habitat.
http://www.aims.gov.au/pages/research/reef-monitoring/ltm/ltm200708-09.html

REEF Website Redesign
The Reef Environmental Education Foundation (REEF) is a grass-roots organization that seeks to conserve marine ecosystems by educating, enlisting, and enabling divers and other marine enthusiasts to become active ocean stewards and citizen scientists. The redesigned REEF website will enable REEF to more effectively recruit, train, and engage divers and snorkelers in the Volunteer Survey Project and other conservation science programs. The website will also facilitate communication through Member Forums.
http://www.reef.org/

Reefbase
Reefbase, a coral reef resource portal, has been recently updated. The website provides data and information on the location, status, threats, monitoring, and management of coral reef resources in over 100 countries and territories, and offers easy access to data, information, publications, photos, and maps related to coral reefs.
http://www.reefbase.org/main.aspx

ReefBase Pacific
The ReefBase Pacific project supports biodiversity conservation, sustainable fisheries, and reef-dependent communities in the Pacific region. The database contains a wide range of published and grey literature, images, maps, and more. Virtual Marine Resource Education Center offers a searchable database for materials that support reef related education and outreach activities developed by various organizations.
http://www.reefbase.org/pacific/

ReefCheck Australia Educational Program
Reef Check Australia has developed an Educational Program for Years 4-7 (although some activities can be adapted for older or younger audiences), focusing on coral reefs, sustainability, and environmental monitoring. The materials have been created to work towards increasing awareness and engendering behavioral change towards more sustainable practices. The website also includes quick fact sheets, photocards, and a teachers' guide.
http://www.reefcheckaustralia.org/for-teachers.html

ReefRanger
Reef Ranger is an educational game that immerses the player in the complex world of coral reef management. The effects on coral reefs of human activities in the mountains all the way to the open ocean are simulated. The game is meant to instill to players an understanding of the complexities of human-environment interactions, the ecological processes in the management of coral reefs and adjacent watersheds, and complexities involved in deriving management strategies.
http://www.ncoremiami.org/reefranger/index.htm

Reefs at Risk in the Caribbean
Reefs at Risk in the Caribbean, in English and Spanish, reflects the culmination of a two-and-a-half-year collaborative effort involving over twenty organizations working in the wider Caribbean region. The project provides a region-wide analysis of human threats to coral reefs and evaluates economic losses likely to result from coral reef degradation. In addition to the summary, the data are downloadable from the website.
http://reefsatrisk.wri.org/

Reefs at Risk in the Caribbean Report
Coral Reefs in the Caribbean span an estimated area of 26 thousand square kilometers, which the authors say dissipates wave and storm energy when hurricanes approach the Caribbean, as well as Florida. The Reefs at Risk in the Caribbean Report, downloadable on this website, reveals that shoreline protection offered by natural Caribbean reefs saves countries between $700 million and $2.2 billion annually. This economic information was calculated through a special threat measurement index.
http://marine.wri.org/pubs_description.cfm?PubID=3944 .

Reefs at Risk Revisited
The Reefs at Risk Revisited report is available to download on The World Resources Institute website. Available materials include the report and executive summary, downloadable high-resolution maps, an interactive map on Google Earth, a 4-minute overview video, downloadable GIS data, and more.
http://www.wri.org/publication/reefs-at-risk-revisited

Reefs on the Web
Reefs on the Web is a collection of links to websites on coral reefs and reef-related resources as a result of research conducted for an article on coral reef websites. Still under construction, it currently hosts listings of publications, governmental and non-government sponsored websites, and a section on monitoring and surveys. While the Communication & Education link still remains to be populated, this website offers a quick source of useful information for students and teachers.
http://barbiemail.googlepages.com/home

ReefTemp
ReefTemp is a mapping product that provides information on coral bleaching risk for the Great Barrier Reef region through a Google Earth application. ReefTemp images are updated daily and include the raw SST, positive SST anomaly, the Degree-Heating Days, and a new thermal stress index, the Heating Rate, all calculated at 2km resolution. ReefTemp produces high-resolution now-casts of bleaching risk and provides an improved ability to monitor heat stress in the Great Barrier Reef.
http://www.cmar.csiro.au/remotesensing/gbrmpa/ReefTemp.htm

ReefVid
Dr. Peter Mumby provides a resource of free coral reef video clips for educational use. Currently, there are approximately 550 video clips on the website, designed for use in PowerPoint, covering reef ecology, diseases, coral bleaching, hurricane impacts, human impacts on reefs, corals, fish, sponges, mangroves, seagrass beds, and more. The website includes a search function and instructions for inserting the clips into your presentations. They can be played from the website or downloaded, and include brief descriptions of each clip.
www.reefvid.org

Referencing Made Easy
The Deadline Due beta website creates a Harvard Reference for a research paper when a book's title or ISBN is entered.
http://www.deadlinedue.com/

Regional Information Centers on MPA Planning Processes
The National Marine Protected Areas Center launched a series of web-based regional information centers designed to provide comprehensive information on ongoing federal, state, and tribal MPA planning processes. Stakeholders can search the information centers by region of the US or by state. While the information centers are a work in progress and not all regions are completely populated, the Pacific Coast and New England regions are either complete or include a significant amount of information.
http://www3.mpa.gov/mpa_calendar/query/searchbyregion.aspx

The Regional Ocean Conservation Club
The purpose of the Regional Ocean Conservation Club (ROCC) is to develop a student coalition where students are encouraged to take an interest and become involved in local marine and aquatic issues facing the environment. The mission is to have high school students work with local, state and national organizations to protect and restore the health of marine and aquatic resources through education and conservation programs.
http://www.igfa.org/ROCC.asp .

Remote Sensing and Coral Reefs
NOAA's Coral Reef Watch offers *Remote Sensing and Coral Reefs*, a free, downloadable curriculum unit for 4th – 6th grade students on remote sensing and its application to monitoring coral reefs. This set of 7 lesson plans is also appropriate for many middle school classrooms, and many of the lessons can stand alone as individual classroom activities. Topics include Remote Sensing and the Electromagnetic Spectrum, Introduction to Coral Reefs, Coral Reef Conservation, and much more.
http://coralreefwatch.noaa.gov/satellite/education/reef_remote_sensing.html

Remote Sensing Lesson Plans from IMaRS
The Institute for Marine Remote Sensing (IMaRS) provides education outreach through a number of venues. IMaRS has presented teacher workshops, with hands-on tools for the manipulation of satellite data as well as background information necessary to provide the correct information to their students. On-line lesson plans and background information are available on their website. The lesson plans include both broad marine science concepts as well as specific remote sensing lab work.
http://education.imars.usf.edu/index.html

Remote Sensing Toolkit
The aim of the online remote sensing toolkit is to show managers, scientists, and technicians working in marine, terrestrial, and atmospheric environments how images collected from satellites and aircraft can be used to map and monitor environmental features or processes and their change over time. Users can select to view graphics or read the text. The resources section offers a quick list of manuals and data sources.
http://ww2.gpem.uq.edu.au/CRSSIS/tools/rstoolkit_new/index.html

Repeat Glacier Photography at Kenai Fjords
Kenai Fjords National Park, located on the eastern edge of Alaska's Kenai Peninsula, is home to the largest concentration of tidewater glaciers in the U.S. National Park System. Changes in these glaciers have never been more obvious nor easy to comprehend, thanks to a cooperative project between the National Park Service and the U.S. Geological Survey.
http://www.oceanalaska.org/research/rptglacier-video.htm

Report in Brief Series
The Division on Earth & Life Studies of the National Research Council produces expert consensus reports each year in such areas as agriculture, water and natural resource management, biosafety, disaster response, climate change energy, and environmental health. In addition, the division produces 4-page briefs about the reports' main findings and conclusions. The Report in Brief series offers the complete set of briefs for the years 2002-2010. The sets are being offered free through July 2011.
http://dels.nas.edu/global/Report-in-Brief-Series

Report on Caribbean MPA Capacity Assessment
The Caribbean Marine Protected Areas Management Network and Forum (CaMPAM) offers the downloadable Caribbean MPA Management Capacity Assessment, with the results of an assessment of management capacity at 27 MPA sites in 10 Caribbean countries and territories. The findings of the report are already forming the basis of a peer-to-peer summit.
http://campam.gcfi.org/CapAssess/CapacityAssessmentReport2011/index.html

Reports from a Warming Planet
American RadioWorks has released this special report on the early signs of climate change. A team of eleven reporters were led by environmental journalist Sandy Tolan. Their assignment was to identify different places around the world where global warming was making changes to both life and landscape. Visitors to the website can listen to the entire radio documentary and read about some of the individual locations profiled in this presentation.
http://americanradioworks.publicradio.org/features/earlysigns/index.html

Representativeness of Marine Protected Areas of the United States
This report assesses two aspects of representativeness in MPAs in United States waters: the presence of MPAs in the 19 marine ecoregions of U.S. waters; and, the presence and representativeness in those MPAs of major habitat types, key natural resources, and ecologically important areas and processes.
http://marineprotectedareas.noaa.gov/dataanalysis/mpainventory/rep-report15.pdf

Research-Based Online Learning Event Model Webinars
COSEE-Ocean Systems offers a series of Research-Based Online Learning Event (ROLE) Model webinars featuring ocean scientists and educators from across the country. Join these experts as they present marine science content through concept-map presentations of their research. The free, hour-long webinars provide direct access to scientists as well as customizable, take-home resources. Check out the link to previous webinars while on the website.
http://cosee.umaine.edu/programs/webinars/

Research in Environmental Education
The EEResearch network is communicating environmental education research to educators, with the goal of improving education programs based on sound research findings. Developed by the Cornell University Civic Ecology Lab and NAAEE's Research Special Interest Group, this blog features research briefs that can be accessed in full.
http://eelinked.naaee.net/n/eeresearch

Research Guides
Boston University Libraries offers this online research guide on more than 40 subjects, including ecology, marine biology, and sustainability. Each guide features links that document key journals in each field, citation indices, websites, and more.
http://www.bu.edu/library/guides/

Research and Monitoring in the National Estuarine Research Reserve System
Special Issue 45 of the *Journal of Coastal Research* is a volume dedicated to research and monitoring in the National Estuarine Research Reserve System (NERRS). It represents the outgrowth of many years of research and monitoring conducted at 26 NERRS sites around the country. The papers comprising this comprehensive publication consist of a wide array of studies conducted by individuals in academia, state and federal government agencies, and independent research institutions.
Contact Dr. Michael J. Kennish at kennish@imcs.rutgers.edu

Research-Supported PBL Practices
This article from Edutopia highlights one high school's strategies backed by research which make project-based learning (PBL) effective and engaging for teachers and students. Links include a guide to best projects, PBL from start to finish, and more.
www.edutopia.org/stw-project-based-learning-best-practices-new-tech-research

Research4Life
Research4Life is a program which provides researchers in developing countries with free or low cost online access to peer-reviewed international scientific journals, books and databases from the world's leading scientific, technical and medical publishers.
http://www.research4life.org/

Resilience Toolkit
Sea Grant has launched the National Sea Grant Resilience Toolkit, a compilation of tools and resources that have been developed over the years by the Sea Grant Network to help local communities become more resilient. Visitors can browse by topic area, tool type, and more.
http://seagrant.noaa.gov/WhatWeDo/ResilienceToolkit.aspx

Resilience Websites
The Nature Conservancy and partners offer two websites addressing the issues of resiliency: Reef and Coastal Resilience. Check out the downloadable Reef Resilience Toolkit, Future Scenarios Mapper, upcoming events, background information, and much more.
http://www.reefresilience.org/home.html
http://www.coastalresilience.org/

Resource Guide For Oceanography and Coastal Processes
The *Oceanography and Coastal Processes Resource Guide* has been developed by the Operation Pathfinder participants. These 81 lesson plans, aligned with National Science Education Standards, support the infusion of concepts and appropriate activities concerning oceanography and coastal process into classrooms across the country. The lesson plans cover coastal processes, organisms and habitats, geology, and chemistry. They range from ROV manipulator arms to camouflage to creatures in the coral.
www.coast-nopp.org/toc.html
www.usm.edu/aquarium

Resource Ranger Club
The Environmental Education Coordination Team was formed to coordinate EE efforts in the Pensacola, Florida area. Team members include agency and industry personnel, teachers, and others. They have developed the curriculum-based Resource Ranger Club, an environmental club in elementary and middle schools. This club includes classroom presentations, follow-up activities, field trips, and a series of award-winning video shows.
godwine@wfrpc.dst.fl.us or 850-595-8910 ext 226.

Resources for Earth Science Teachers
Created and maintained by the Massachusetts Geological Survey, this webpage links to resources for earth science teachers working with high school and college students. The resources are organized into nine areas, including Lesson Plans, Fiedltrips, and more. Note, however, that the page was last updated in 2008.
http://www.geo.umass.edu/stategeologist/frame_edu.htm

Resources for Earth Sciences and Geography Instruction
Central Michigan University hosts this clearinghouse for science educators and students interested in the fields of earth science and geography. The website is organized alphabetically around the sequence of topics that one might encounter in an introductory earth science or physical geography class, including Atmospheric Circulation, Earth Science Animations, Rivers, Water Resources, and much more. Each topical area includes links to online resources, complete with a short description.
http://webs.cmich.edu/resgi/

Resources for Environmental Literacy: Science-Environment Modules for Teachers
The Environmental Literacy Council's Resources for Environmental Literacy project brought together scientists, classroom teachers, and curriculum developers who gathered materials from a variety of disciplines and sources to produce professional development materials for middle level and high school teachers in physical science, earth science, life science, biology, and physics. Downloadable modules include:

- Earth Science - earthquakes, volcanoes, and plate tectonics;
- Life Science - species diversity and the impact of mass extinctions;
- Biology - the science, risks, and tradeoffs of genetically modified crops;
- Physical Science - Earth's energy balance and global climate change; and
- Physics - the science of radioactivity and issues surrounding the disposal of radioactive waste.

http://www.enviroliteracy.org/subcategory.php/316.html

Resources for K-12 Earth Science Educators
This page from the Geological Society of America: provides links to educational resources for K-12 science educators with downloadable lesson plans on a myriad of topics including earth science, environmental science, water, weather and climate, and more. There are links to elementary, intermediate, secondary lesson plans, and additional resources. Check this out; many are links to websites not previously covered in this newsletter.
http://www.geosociety.org/educate/resources.htm

Resources for Learning
The American Museum of Natural History offers Resources for Learning, an online collection of activities, articles, and more, for educators, students and anyone interested in teaching or learning about science. There are over 1000 resources to choose from, browsable by topic, keyword, and special collection. Topics include earth science and biology; special collections include water, climate change, and Ology, the museum's website for kids.
http://www.amnh.org/education/resources/

Resources for Marine Educators
Ryan Cilsick offers this website with links to various resources for marine educators, including links to the Castro-Huber textbook, marine science apps, and more.
https://sites.google.com/a/share.brevardschools.org/cilsick/resources-for-marine-educators

Resources for Scientists in Partnership with Education
Resources for Scientists in Partnership with Education (ReSciPE) is a project of the Coorperative Institute for Research in Environmental Sciences (CIRES) with funding from the National Science Foundation. ReSciPE is designed to assist scientists who are engaged with K-12 education. The program offers professional development workshops, development and sharing of resources, and a research study.
http://cires.colorado.edu/education/k12/rescipe/

Resources for STEM Education
The NSF hosts this K-12 Resources for STEM Education website with links to resources and findings generated through educational research and development projects funded in part by the National Science Foundation. Materials include professional development, instructional materials, assessment, and research syntheses.
http://www.nsfresources.org/home.cfm

Resources for Teaching Meteorology
The Sourcebook for Teaching Science offers materials for science educators in the fields of biology, chemistry, physics, and the geophysical sciences. The meteorology section links to resources for teaching meteorology from many institutions, including NOAA, the National Science Foundation, and National Geographic. The materials are divided into five areas, including The Atmosphere, Climate, and Teaching Resources. Be sure to check out other resources offered here.
http://www.csun.edu/science/geoscience/meteorology/index.html

Respect the Beach
Respect the Beach is a coastal educational program that includes classroom lectures, handouts, video, hands-on projects, and more, designed to teach coastal watershed

processes, shoreline ecology and coastal areas stewardship. The program is brought into classrooms by Surfrider members, who represent ocean environmentalism from the surfer's perspective, and who are role models that students can relate to. Programs include Beachology, Watershed Works, and the Snowrider Project.
http://www.surfrider.org/programs/respectthebeach.asp .

Respected Access
Tread Lightly! has developed the first products from a multi-dimensional education and outreach campaign built around a central slogan, *Respected Access is Open Access*. The message is simple – responsible behavior leads to continued access. Check out the public service announcements, resources, and more.
http://www.respectedaccess.org/open-access/

Response and Restoration Education
NOAA's Office of Response and Restoration (OR&R) offers educational materials to explore efforts to protect and restore the nation's waters from pollution. Find experiments and information about oil behavior and beach sediments, ecological recovery, oil spills, and more.
http://response.restoration.noaa.gov/training-and-education/education-students-and-teachers

Response and Restoration Materials
NOAA's Office of Response and Restoration has created the Chemical Reactivity Worksheet to help teachers, students, and the general public learn about the chemical reactivity of thousands of common hazardous chemicals. In addition, the website offers experiments and activities for elementary school students and others on the Education pages.
http://response.restoration.noaa.gov/chemaids/react.html

Restore the Gulf
Created by the federal government, RestoretheGulf.gov provides the public with information on the response to the Deepwater BP oil spill, along with news updates and links to other governmental partners. The Assistance area contains information about claims and appeals, how to stay safe in and around the area, and also about how to volunteer with relief efforts. Other categories include news, response, and more.
http://www.restorethegulf.gov

Rethinking Protected Areas in a Changing World
The George Wright Society adheres to an open-access publication philosophy and as such, they have published on the web "Rethinking Protected Areas in a Changing World: Proceedings of the 2011 Conference on Parks, Protected Areas, and Cultural Sites." Note that it is a 423-page volume containing 71 papers from the conference last year in New Orleans, but each section can be downloaded individually. Topics include fire, climate change, ecotourism, and much more.
http://www.georgewright.org/proceedings2011

Return to Titanic Program
Commemorate the 100th Anniversary of Titanic's sinking with Immersion Learning's Return to Titanic Program, including hands-on activities, videos, and interactive online games that engage students in science, technology, and exploration. Online resources include an interactive Titanic Moviemaker game, a sample classroom activity, and more.

Two professional development workshops will be held, June 2 and June 8, 2012 in Mystic, Connecticut; participants receive the multimedia pack.
http://www.immersionlearning.org/titanic

Reuse Warehouse
Another Good Idea: The City of Houston Building Materials Reuse Warehouse accepts donated construction materials from builders, supply companies, remodelers, contractors, and individuals. These materials are made available at no charge for use by any non-profit organization. The warehouse benefits the community by providing storage space for excess building material that would otherwise be dumped in local landfills.
http://www.greenhoustontx.gov/reuse.html

Rhythm of Conservation
Kids can learn about a different animal every day through the Rhythm of Conservation Sweepstakes website from AZA and K12. Visitors can browse interactive educational activities and lessons about conservation, enter a sweepstakes daily, and more.
http://www.rhythmofconservation.com/

Richmond Bridge Harbor Seal Survey
The Richmond Bridge Harbor Seal Survey is a collaborative research project between San Francisco State University and the California Department of Transportation, examining possible effects of seismic-related bridge construction on resident harbor seals in the San Francisco Bay. The website provides an overview of the project; tracking and tagging activities; and basic information about harbor seals. The site also provides Kids' Pages with photo ID matching, and wildlife of San Francisco Bay.
http://userwww.sfsu.edu/%7Ehalmark/seals.htm

Ridge 2000 Deep Sea Explorations
Ridge 2000 is a multidisciplinary science research program focused on integrated geological and biological studies of the mid-ocean ridge system. The premise of Ridge 2000 science is that life in deep-sea ecosystems is linked to the flow of energy and material from Earth's deep mantle, through the volcanic and hydrothermal systems of the oceanic crust, to the deep ocean. The website offers a materials and information; the expeditions page links to current and past research cruises,
http://www.ridge2000.com/index.html .

Riffle Fish
Riffle Fish is an evolving webumentary about the plants and animals that live in the riffles of rivers and streams. The on-line documentary will include new clips about the insects, mollusks, fish, and amphibians that make up the riffle community. The site will also provide interviews about the science of riffle ecology and the conservation efforts to preserve their biodiversity.
http://www.rifflefish.com/

Right Whale Game
The Ocean Conservancy partnered has created a website devoted to right whales. The site offers an interactive right whale game where you can navigate the right whale safely through trash, lobster traps, and ships; right whale information; a coloring page, and more.
http://www.oceanconservancy.org/site/PageServer?pagename=OceanHall

Right Whale Listening Network
The Cornell Lab of Ornithology hosts this website showing buoy information from the Stellwagen Bank area that has been set up to listen for right whales and notify area ships of their proximity. The website also offers links to background information about right whales, bioacoustics, and more.
http://www.listenforwhales.org/Page.aspx?pid=430

Ring in Oyster Season
The Bridge features a series of Data Analysis Teaching Activities (DATAs) that can be used to supplement curriculum materials. The Bridge DATA, On the Half Shell, explores *Vibrio vulnificus*, a virulent bacterium that occurs naturally in warm coastal waters. Students will examine five years of Centers for Disease Control data to explore the dangers associated with improperly handled seafood.
On the Half Shell http://www.marine-ed.org/bridge/index_archive1204.html

Rip Currents: Break the Grip of the Rip
NOAA's National Weather Service and National Sea Grant Program, in partnership with the United States Lifesaving Association, are working together to raise awareness about the dangers of rip currents. Research is also being conducted in order to develop and improve the ability to predict the occurrence and strength of rip currents. A new website has background information, a downloadable brochure and sign, and links to other information.
http://www.ripcurrents.noaa.gov/index.shtml .

Rise and Shine: A Practical Guide for the Beginning Science Teacher
Rise and Shine provides a friendly support system that new science teachers can turn to. The book offers techniques for managing the classroom, maintaining discipline, and dealing with parents. It also covers topics unique to science teaching, such as setting up a laboratory, keeping the classroom safe, and initiating inquiry from the first day. The website offers additional useful resources that relate to the chapters including a shopping list, report card comments, and more.
http://www.nsta.org/publications/press/extras/riseandshine10.aspx

Rivers Alive Clean-Up - Georgia
Register your cleanup event for Georgia's annual volunteer waterways cleanup by July 31, 2007 to receive free T-shirts or patches for your volunteers (first come first serve basis), a radio Public Service Announcement, educational posters, and promotional posters to help you advertise your cleanup event.
http://riversalive.com/ra_index.htm

Rivers to Reef
The Rivers to Reef segment of the Gray's Reef Ocean Science Course is now available. It includes a DVD of a feature length program that describes the Altamaha River Watershed and its direct influence on Gray's Reef. The DVD program features underwater footage of Gray's Reef and of inland areas through which the river flows as well as interviews with key players in studying the various links of the watershed. The package includes a manual of background information and activities.
Contact Cathy Sakas at Cathy.Sakas@noaa.gov

Rivers, Trails and Conservation Assistance Program
The Rivers, Trails and Conservation Assistance program provides staff time and technical assistance for projects that need an extra hand to take the next leap forward to success. The program works with citizens' groups and non-profits, helping them realize their vision of how to improve their communities. The website offers informational publications, information about applying for assistance, links to online resources for river conservation and trail development, and more.
http://www.nps.gov/rtca

Riverquarium
The Flint Riverquarium will open in Albany, Georgia, to promote conservation through aquatic exhibits and educational experiences that engage diverse audiences by interpreting the unique ecosystems of the Flint River watershed. Exhibits will feature fish and other aquatic animals from the Flint River and downstream, including Apalachicola Bay, Lake Seminole and the Gulf of Mexico. In addition, the Riverquarium hosts a World of Water exhibit featuring river systems from around the world.
www.flintriverquarium.com .

RiverXchange Curriculum Program
RiverXchange is a year-long water resources curriculum with class partnerships through social networking technology. New Mexico 5th graders are partnered with high tech pen pals elsewhere to share what they are learning about water resources issues relating to their local river. The program provides a multidisciplinary learning experience for students throughout the school year, integrating standards-based science, social studies, and math lessons with essential writing skills to teach about water resources.
http://riverxchange.com/

R.J. Dunlap Marine Conservation Program Education
The mission of R.J. Dunlap Marine Conservation Program is to foster STEM literacy and advance marine conservation by conducting cutting edge scientific research and involve graduate, undergraduate, and high school students through hands-on field and virtual learning experiences. The website includes virtual learning resources and high school curriculum.
http://rjd.miami.edu/education

R.J. Dunlap Marine Conservation Program Learning Resources for Teachers
The mission of R.J. Dunlap Marine Conservation Program is to foster STEM literacy and advance marine conservation by conducting cutting edge scientific research and involving graduate, undergraduate, and high school students through hands-on field and virtual learning experiences. Resources include curriculum, a virtual expedition tagging expedition, shark tracking, a Digital Atlas of Marine Species & Locations, and more.
http://www.rjd.miami.edu/learning-tools/

RMS *Titanic* Expedition 2004
Dr. Robert Ballard and scientists from NOAA and other institutions spent 11days, May 27-June 12, 2004, at the site of the sunken remains of the R.M.S. Titanic, mapping the ship and conducting scientific analyses of its rapid deterioration. The team worked aboard the NOAA research vessel Ronald H. Brown and used ROVs to document the current state of Titanic. Educators and scientists developed a series of lesson plans for students in Grades 5 – 12 that are specifically tied to the Return to Titanic Expedition.

http://oceanexplorer.noaa.gov/explorations/04titanic/welcome.html and www.returntotitanic.com .

Road to Recovery
The Center for Biological Diversity has created a website detailing the conservation efforts that caused the populations of 100 endangered species in every U.S. state and territory to increase. The website includes information about the conservation efforts along with a chart of the species' population over time. Citations allow those interested to research deeper into each species' recovery.
www.esasuccess.org

Rock the Boat
The University of California Sea Grant Extension Program offers a myriad of online resources for boating environmental education. The program has published a variety of materials on how boaters can help to protect water quality and native marine life. The website offers information on clean boating practices, reducing pollution from antifouling paints, and preventing invasive species from riding on boat hulls. Materials include technical reports and fact sheets, video-documentary and radio PSAs, and more.
http://seagrant.ucdavis.edu

Role of Protected Areas in Sustaining Society
The proceedings of the World Congress on National Parks, which took place in Bali, Indonesia, in October 1982, *National Parks, Conservation, and Development - the Role of Protected Areas in Sustaining Society* can be downloaded in pdf format from the IUCN (World Conservation Union) Protected Areas Learning Network website. While on the website, check out other documents using the browse feature.
www.parksnet.org/docs/0/77231_documents_document_file_65.pdf

Ross Sea Connection
Follow along with scientists and crew on a month-long cruise in the Ross Sea. The scientists will study the phytoplankton at the base of the Ross Sea's food web and the special combination of currents, nutrients, and trace metals that allow it to thrive. A collection of related lesson plans and activities is available on the website.
http://coseenow.net/ross-sea/

Roundhouse Marine Studies Lab and Aquarium School Programs
The Roundhouse Aquarium is now booking for 2008-2009 field trips. Classes include Marine Science Education Field Trips for grades K-12, Key to the Sea for K-5 teachers, Tidepool Field Studies and Tidal Wave Outreach, and more. Some grants are available.
http://www.roundhouseaquarium.org/school.html

ROV Competition
Teachers interested in learning about Remotely Operated Vehicle (ROV) technology and its application in ocean studies, and in learning how to build a ROV with students and pull together a student team to participate in a regional ROV competition, can join NOAA's Monitor National Marine Sanctuary and others for the 3rd Annual Mid-Atlantic Regional MATE Remotely Operated Vehicle Competition, April 19, 2008 in Hampton, Virginia.
http://marinetech.org/rov_competition/regional_contests/regional_contest.php?rov_competition_id=48

ROV Competition
The Marine Advanced Technology Education (MATE) Center and the Marine Technology Society's ROV Committee are partnering with Ocean.US and the Ocean Research Interactive Observatory Networks (ORION) Program to organize their 5th annual international student ROV design and building competition. The Neutral Buoyancy Laboratory at the NASA Johnson Space Center will host the event in June 2006. The 2006 ROV competition will focus on ocean observing systems.
http://www.marinetech.org/rov_competition/index.php

ROVing the Gulf
Discovery Hall Programs is adding a new class activity to their field trip offerings. The new class, ROVing the Gulf, teaches middle and high school students about technology used by scientists to study the ocean, especially the deep sea. Students will learn about the physics of water and water movement, some basic design principles, and will then be given the opportunity to build their own ROV. Students will also learn about the Gulf of Mexico and its deepwater habitats and many aspects of deep sea research.
http://dhp.disl.org/k12academic.htm

Rozalia Project
The Rozalia Project puts together expeditions to clean the oceans, lakes, and rivers of marine debris using action, technology, education, and research. Join as virtual crew members on American Promise and partner vessels to be part of these expeditions right from school. Once or twice a week, participants receive a Daily Mission Report with photos, data, activities, and more based on project cleanup and research.
http://www.rozaliaproject.org/mission_atlantic/

RSMAS Oil Spill Website
The University of Miami's Rosenstiel School of Marine and Atmospheric Sciences has established an oil spill educational outreach website. It offers a timeline, satellite images, modeling and predictions, and more.
http://www.rsmas.miami.edu/oil-spill/

RU COOL
Rutgers University Coastal Ocean Observation Lab focuses on the bio-physical processes of the coastal ocean. The lab is involved in research projects where operational observatories are used to collect real-time data for adaptive sampling. The website offers research data, papers, and presentations; sections for educators and students; multimedia; and much more.
http://rucool.marine.rutgers.edu/

RubiStar – Free Generic Rubrics for Teachers
Rubics can be quite time-consuming to develop. The RubiStar website provides tools to help the teacher who wants to use rubrics but does not have the time to develop them from scratch. RubiStar provides generic rubrics that can simply be printed and used for many typical projects and research assignments, or customize your own from their format.
http://rubistar.4teachers.org .

Run for Water
The Dow Live Earth Run for Water, April 18, 2010, will consist of events in countries around the world, featuring concerts and water education activities aimed at igniting a tipping point to help solve the water crisis.
http://liveearth.org/en/run

Russian-U.S. Arctic Census 2009
The RUSALCA mission set sail from Nome, Alaska on the Russian Research Vessel *Professor Khromov* on August 22, for a 40-day voyage into the Bering Strait and northwards to the Pacific side of the Arctic Ocean. RUSALCA stands for Russian-American Long Term Census of the Arctic, and also means mermaid in Russian. Visit the website for an overview of the mission, along with links to blog posts, RSS feed, and more.
http://oceanexplorer.noaa.gov/explorations/09arctic/

Russian–U.S. Arctic Census 2012 Expedition
NOAA's Office of Ocean Exploration and Research has launched the Russian–U.S. Arctic Census 2012 Expedition web pages on its Ocean Explorer website. The expedition is expected to run August 28-September 17, 2012. The overall purpose of the project is to provide ways to detect and measure changes in Arctic Ocean ecosystems. The expedition posting includes daily logs, videos and images, lesson plans, and more.
http://oepreview.nos.noaa.gov/explorations/12arctic/welcome.html

Rutgers Ocean Days – New Jersey
Rutgers Ocean Days brings science students (grades 3-12) to New Brunswick, New Jersey April 8-11, 2014, to excite and engage students in ocean science by providing a platform for them to learn from Rutgers oceanographers and to share results from their investigations with one another and Rutgers oceanographers. See the website for complete details.
http://coseenow.net/mare/ocean-day/

Rx Effects
Rx Effects is the newsletter of the Fire Effects Monitoring Program in the National Park Service. It is an outlet for information on Fire Effects Monitoring, fire research, and other types of wildland fire monitoring. The newsletter is annually produced for the National Park Service but anyone with an interest in fire ecology is encouraged to submit information about their program or research. The newsletter is a mixture of science, entertainment, and the occasional haiku. Rx Effects is issued each year in the spring.
http://www.nps.gov/fire/fire/fir_eco_rxeffects.cfm

SA Fishing Regulations Mobile App
South Atlantic Fishery Management Council offers a free mobile app for both Apple and Android users. The SA Fishing Regulations app is a searchable guide to federal fishing regulations and saltwater fish identification in the South Atlantic region of the U.S., including North Carolina, South Carolina, Georgia, and the East coast of Florida. The app includes fish identification information, recreational fishing regulations, and more.
https://play.google.com/store/devices
https://itunes.apple.com/us/app/sa-fishing-regulations/id608710852?mt=8

Sad Day for Oxford Junior Dictionary
In order to make room for modern words like MP3 player, chatroom, and database, the latest edition of the *Oxford Junior Dictionary* removed many nature-related words as a result of the changing landscape. So BlackBerry now takes the place of blackberry, and it's a cautionary tale for ivy.
http://www.nextnature.net/?p=3110

Safe Trails Forum
American Trails hosts the online Safe Trails Forum to share information on ways to improve trail experiences for users while making management more effective. The goal of the forum is to continue to improve trail safety and to assure that the risks associated with trail recreation are kept in balanced perspective. The Forum collects resources on liability, insurance, and legal issues; trail maintenance concerns; crime and accident reporting; and provides a forum for discussion.
http://www.americantrails.org/resources/safety/index.html

Safeguarding Sea Turtle Nesting Beaches
WIDECAST (Wider Caribbean Sea Turtle Conservation Network) offers the following publication for downloading from its website in both English and Spanish: Manual of Best Practices for Safeguarding Sea Turtle Nesting Beaches, by Choi and Eckert. While on the website, check out the resources for educators, sea turtle biology, and more.
http://www.widecast.org/Resources/Pubs.html

Safeguarding Wildlife from Climate Change Webinars
The National Wildlife Federation offers a series of monthly webinars with experts on climate change and wildlife related issues. They will highlight experts in the emerging climate change and wildlife field as well as state and federal agencies in the forefront of integrating climate change into their wildlife management efforts. The archives are posted and include a pdf of the presentation, background reading, the recorded seminar, and more.
http://training.fws.gov/EC/Resources/climate_change_webinars/archives.html

Sail the Book
Ira Bickoff, a former Teacher at Sea, offers this website to promote maritime literature and ocean literacy through art, history, and science. He has created Google Earth chapter tours for five classic maritime books, with chapters and activities for points of interest in the tours. The website also offers video tutorials and a user manual.
http://www.sailthebook.net/

Sailors for the Sea
Sailors for the Sea engages the sailing and boating community through education and inspiration. Their Kids Environmental Lesson Plans (KELP) downloadable modules are based on the seven principles of Ocean Literacy. The lesson plans are focused on the informal educator and are contributed by leading marine institutions and organizations. Free registration is required. Be sure to check out the Ocean Watch articles, Clean Boating information, blogs, and more.
http://sailorsforthesea.org/

Sally Ride Science Festivals
Sally Ride Science Festivals bring together hundreds of middle school girls for a festive day of science and socializing, to support girls in grades 5-8 in their interest in science

and in possible science-related careers. Dr. Ride provides the keynote speech, and girls can enjoy a hands-on science street fair and attend discovery workshops on a variety of science careers. There are often workshops for parents and teachers.
http://www.sallyridefestivals.com/

Salmon & Steelhead: A Time for Recovery
The Steelhead and Stream Recovery Coalition has recently created and released a movie about the plight of Steelhead Salmon and how we can protect them. The QuickTime movie is downloadable from the website or available at no charge to marine educators for classroom use and distribution.
http://www.steelheadrecovery.org
Contact Marla Morrissey at marlamorrissey@gmail.com

Salmon Resources
The Atlantic Salmon Trust offers downloadable resources about Atlantic Salmon, including its life cycle, habitats, and more.
http://www.atlanticsalmontrust.org/learning-zone/index.html

Salt of the Earth
This video from NASA features scientists who describe the role of salt in the oceans and global oceanic circulation with reference to global climate change. Be sure to check out the other videos and materials on this website. Note that the Climate Reel website address has changed and now sports a hyphen.
http://climate.nasa.gov/climate-reel/
http://climate.nasa.gov/ClimateReel/video/Salt_of_the_Earth_640x360.cfm

Salt Marshes: A Natural and Unnatural History
This book puts salt marshes into a broad environmental context. Chapters include salt marsh basics, pollution, and restoration. The appendix has a species index, and the book comes complete with references and an index.
http://rutgerspress.rutgers.edu/acatalog/Salt_Marshes.html

San Diego Bay: A Story of Exploitation and Restoration
The book, San Diego Bay: A Story of Exploitation and Restoration, features a synthesis of artistry and information in describing a complex urban marine environment - the historic and present uses of San Diego Bay. The book was researched, written, and designed by a class of 64 high school students at High Tech High in San Diego. The stories revolve around progress in the region related to local geography and the utilization of resources. The book includes oral histories and much more.
http://anrcatalog.ucdavis.edu/InOrder/Shop/ItemDetails.asp?ItemNo=SG022

San Diego Natural History Museum Exhibits
The San Diego Natural History Museum website offers companion material to a changing array of museum exhibits. The exhibit information includes online activities, educational resources, field guides, online lectures, and much more. In addition to the current exhibits, make sure to check out the archives of past offerings, including Glow: Living Lights, Earth, Wind & WILDFIRE, and much more.
http://www.sdnhm.org/exhibits/

San Diego Natural History Museum Field Guides
The San Diego Natural History Museum's Biodiversity Research Center of the Californias works to understand and interpret the biodiversity of Southern California and the peninsula of Baja California. The museum provides links to information about its various departments and offers online access to databases for two collections. On-line checklists and field guides are available for a variety of regional plants and animals.
http://www.sdnhm.org/fieldguide/index.html

San Francisco Ocean Film Festival
The San Francisco Ocean Film Festival will take place February 3-7, 2010 in San Francisco, California. Three short films to be included were created by students in the National Marine Sanctuary and partners' Ocean For Life program this past summer; two will be featured in the main program, and the third in the special Youth Program which should draw up to 1,100 middle- and high-school students from 23 schools.
http://www.oceanfilmfest.org/

San Francisco Ocean Film Festival
San Francisco Ocean Film Festival is celebrating its 5th anniversary, February 2-3, 2008 in San Francisco, California. It is dedicated to using film to enhance the public's appreciation for the ocean's multifaceted importance to our planet. By screening a wide variety of films from all over the world, the audience is able to experience works that are largely unavailable to the general public. Participants will walk away entertained, better educated, and motivated to actively participate in ocean conservation.
http://www.oceanfilmfest.org/

Sanctuaries of the Caribbean
Sanctuaries of the Caribbean is a short film about MPAs in the Southeastern Caribbean, produced as part of the Coastal and Marine Management and Education in the Southeastern Caribbean project. It can be viewed on YouTube.
http://www.youtube.com/watch?v=sMKKkpLreXw

Sanctuaries and Climate Change
The Office of National Marine Sanctuaries offers this website with an introduction that explains what kind of climate change impacts sanctuaries can expect to face; what sanctuaries can do about climate change impacts; and detailed pages on adaptation, mitigation, science, and outreach - all featuring links to climate-related work and greening projects across the system.
http://sanctuaries.noaa.gov/management/climate/welcome.html

Sanctuaries Fun Pages
The National Marine Sanctuaries For Fun website offers games and downloads for young students. Download the new Ocean Guardian Activity Book, play the Kure Waste Chase game, go on a virtual submersible dive into Monterey Bay, work puzzles, and much more. Students can spend hours here, learning about the ocean all the while.
http://sanctuaries.noaa.gov/education/fun/

Sanctuary Alphabet Mini-Poster
Scroll down the page to download the photo collage of images from the Flower Garden Banks National Marine Sanctuary showing alphabet shapes from A to Z. And be sure to look through the other educational resources on the website.
http://flowergarden.noaa.gov/document_library/eddocuments.html#abc

Sanctuary Atlas Maps, Images, and Videos
Download atlas maps, high resolution images, and watch compelling videos from the 14 marine protected areas managed by NOAA's National Marine Sanctuaries Program.
http://sanctuaries.noaa.gov/pgallery/

Sanctuary Calendars
The National Marine Sanctuary Foundation is a non-profit organization created to assist the National Marine Sanctuary Program with education and outreach programs designed to preserve, protect and promote meaningful opportunities for public interaction with the nation's marine sanctuaries. T
http://nmsfocean.org/

Sanctuary Exploration Center - California
The city of Santa Cruz and NOAA will host an opening ceremony, July 23, 2012 in Santa Cruz, California for the Monterey Bay National Marine Sanctuary Exploration Center. The hands-on center celebrates and educates about the Monterey Bay and its marine life with interactive exhibits, daily activities, and more.
http://montereybay.noaa.gov/vc/sec/welcome.html

Sanctuary Integrated Monitoring Network
NOAA and partners have launched SIMoN, the Sanctuary Integrated Monitoring Network, a user-friendly website featuring background information about three West Coast national marine sanctuaries, Monterey Bay, Gulf of the Farallones, and Cordell Bank, along with information about the latest scientific research in these locations. Topics include rocky shores, estuaries, geology, and much more. The website includes a photo library, interactive maps, species database, and more.
http://www.sanctuarysimon.org/index.php

Sanctuary Integrated Monitoring Network
The Monterey Bay National Marine Sanctuary launched the Sanctuary Integrated Monitoring Network (SIMoN). Users can access the website to obtain local water quality monitoring information, generate watershed maps, locate monitoring information, link to data sets from individual stations, and download GIS layers.
http://mbnms-simon.org .

Sanctuary Ocean Count – Hawai'i
Participate in the Sanctuary Ocean Count project, which offers the community a chance to monitor humpback whales from the shores of O'ahu, Hawai'i, and Kaua'i. The count is held during peak whale season on the last Saturdays of January, February, and March.
http://hawaiihumpbackwhale.noaa.gov/involved/ocwelcome.html

Sanctuary Sam
The NOAA National Marine Sanctuary Program has announced the launch of a new national ocean literacy, education, and public awareness campaign featuring Sanctuary Sam, a California sea lion who will be the program's "spokes-sea lion." Sanctuary Sam will help convey messages to the American public, particularly children, about the marine environment, highlighting the current problems facing the oceans, including pollution, marine debris, and habitat destruction. Learn more by visiting his MySpace page.
http://myspace.com/sanctuarysam

Sanctuary Science Conservation Series
The Marine Sanctuaries Conservation Series provides a forum for publication and discussion of the complex issues the National Marine Sanctuary Program faces. Topics of published reports vary and may include descriptions of educational programs, discussions on resource management issues, and results of scientific research and monitoring projects.
http://sanctuaries.noaa.gov/science/conservation/welcome.html

Sanctuary Watch
The latest issue of *Sanctuary Watch*, a publication from NOAA's Office of National Marine Sanctuaries. features America's Great Outdoors: The Ocean, Connecting Children to the Great Outdoors; an animated story about the *R/V Manta*; and more. You can download a copy of this issue and read archived issues from the website.
http://sanctuaries.noaa.gov/news/sw/

Sanctuary Watch
Sanctuary Watch is a publication produced by NOAA's Office of National Marine Sanctuaries. It includes news about happenings in the sanctuary program, "Critter Files" that highlight specific species of animals, spotlights on sanctuary partners and staff, and beautiful photos. Subscribe to the online publication and look through past editions on the website.
http://www.sanctuaries.noaa.gov/news/sw/welcome.html

Sanctuary Watch: Education Edition
Ocean education and hands-on field activities from around the country are highlighted in the new education edition of the Sanctuary Watch newsletter produced by NOAA's National Marine Sanctuary Program. You can subscribe to Sanctuary Watch electronically by sending an email to requests@willamette.nos.noaa.gov and putting "subscribe sanctuarywatch" in the subject line.
Sanctuary.Education@noaa.gov .

Sanctuary Videos
Flower Garden Banks National Marine Sanctuary offers short videos about the coral reefs and other aspects of the sanctuary, targeting upper elementary and middle school students. Topics include coral spawning, sharks and rays, and more. The videos are available in both English and Spanish.
http://flowergarden.noaa.gov/image_library/video.html

Sand Blog
The Bridge blog now features information for those interested in teaching about, and using, sand with their students. The Blogger shares tips and resources for incorporating the study of sand into the classroom. For those interested in swapping sand with others around the globe, check out the sand swap information. If you are currently using sand with your students, or collect sand from your travels and friends, join in the conversation.
http://bridge.blogs.wm.edu/sand/
http://www.marine-ed.org/bridge

Sands Teach
The recent scuttlebutt discussion on using sand in teaching has generated an exchange of great websites that can help you incorporate sand as a teaching tool in your

classrooms. Check out some of these resources, and don't forget to check out the links from the Bridge (search on "sand").
http://www.sandcollectors.org/ISCSHomeIndexx.html
http://www.jaster.20m.com/Trading/TradeList.html
http://www.educationworld.com/a_tech/tech/tech080.shtml
http://www.chariho.k12.ri.us/curriculum/MISmart/ocean/sandintr.html

Sandwatch
Sandwatch is a volunteer network working together to monitor and enhance their beach environments. The Sandwatch Manual is available for downloading from the website. This manual includes activities, such as making a set of sieves to measure sand composition, using Google Earth to map the beach, and steps for designing and implementing a Sandwatch project. The manual also has information relating to climate change and a set of climate change adaptation activities to build beach resilience.
http://www.sandwatch.ca/index.htm

Sandwatch
Sandwatch seeks to modify the lifestyle and habits of children, youth, and adults on a community-wide basis and to develop awareness of the fragile nature of the marine and coastal environment and the need to use it wisely. It is an educational process through which school students and community members learn and work together to critically evaluate the problems and conflicts facing their beach environments and to develop sustainable approaches to address these issues. With a strong field monitoring component, Sandwatch tries to make science 'live' yet remains inter-disciplinary with applications ranging from biology to woodwork and from poetry to mathematics.
http://www.sandwatch.ca/index.htm

Sandwatch Manual
Sandwatch is a volunteer network of schools: students, teachers and principals; youth groups; non-governmental; and community-based organizations; working together to monitor and enhance their beach environments. The new *Sandwatch Manual: Adapting to Climate Change and Educating for Sustainable Development*, is available for downloading from the website in English, Spanish, and French. The manual includes activities on beach debris, water quality, currents, and more.
http://www.sandwatch.ca/index.php?option=com_content&view=category&layout=blog&id=9&Itemid=4

Santa Barbara Ocean Film Festival
Santa Barbara's Ocean Film Festival will be held October 22-23, 2008 in Santa Barbara, California.
http://www.ocean.com/index.asp?LocationID=311&CatId=311

Satellite Observations in Science Education
The Satellite Observations in Science Education website from the University of Wisconsin promotes the teaching and learning of the Earth system through quality educational resources that make use of satellite observations. The website includes learning activities, resources useful to building your own learning activities, satellite data, and more.
http://www.ssec.wisc.edu/sose/

Satellites and Bleaching
NOAA Coral Reef Watch offers an online tutorial that takes the student through coral bleaching, satellite technology, and how we use satellite data to monitor for the conditions that cause bleaching. The tutorial uses non-technical language and can be useful for students, teachers, and others wanting to learn more about coral reefs and satellite technology. The lessons are tied to National Science Education standards for use in the classroom.
http://coralreefwatch.noaa.gov/satellite/education/tutorial/welcome.html

Satellites and Orbits: an Introduction
NOAA's Satellite and Information Service takes complex satellite and orbit information and transforms them into easy to understand concepts with lots of animation sure to catch a student's attention, for grades 8-12. Highlights include a short satellite history, a non-mathematical review of basic orbital physics, orbital terminology, and orbit types with a focus on Earth observation and environmental monitoring. Other features include a hands-on demonstration, a student activity, background information and instructions.
www.npoess.noaa.gov

Satellite Resources
NOAA's Satellites and Information Service manages data relating to the Earth and solar environments. The National Environmental Satellite, Data, and Information Service has compiled a website listing resources of interest to students and educators. Materials include posters and slide sets, teacher guides and quizzes, fact sheets and handouts. Links lead to numerous related sites, such as the World OceanAtlas, the Climatic Data Center, and sources of information on sea ice, ice shelves and glaciers.
http://www.nesdis.noaa.gov/outreach_edu.html

Satellite Tagging of Marine Mammals and Turtles
These satellite tagging units from WhaleNet can be used in learning different concepts, including geography, habitat use by organisms, math, map skills, comprehensive reading, and more. The active tags are highlighted, and over 155 archived satellite tagging events are available.
http://whale.wheelock.edu/whalenet-stuff/stop_cover.html

Savannah Ocean Exchange - Georgia
Savannah Ocean Exchange shares the worldwide solutions that drive sustainable change; improve ecological, economic, and worldwide connectivity; while respecting the unique cultures and sense of place of our coastal communities. The exchange will offer activities throughout September, 2011 in Savannah, Georgia, highlighting Culture & Cuisine, Events & Excursions, Presentations & Performances, and Vessels & Viewings.
http://www.savannahoceanexchange.org/

Save Our History
This History Channel website provides a downloadable Educator's Manual designed to help educators incorporate local history into the classroom and introduce students to the concept of preservation. The manual includes lesson plans for elementary, middle, and high school teachers linked to state history standards in all 50 states.
http://saveourhistory.com/

Save Our History, Save Our Ships
"Save Our Ships" is the History Channel's effort, in conjunction with National Maritime Historical Society, to stem the tide of deterioration and destruction of historical ships. The website offers a short teacher's manual with lesson plans, as well as a special online exhibit of five ships featured in The History Channel's documentary, *Save Our History: Save Our Ships*. The resource page provides links to websites and books for more information.
http://www.historychannel.com/classroom/saveourships/default_home.html

Save the Whales Outreach Programs
Save The Whales offers hands-on classroom programs in Monterey and Santa Cruz Counties. Programs include the Land & Sea Watershed Model, Marine Mammals: Adaptations and Communications, Sea Otters: A Story of Survival, and more.
http://www.savethewhales.org/wow.html

Saving Species by Translocation
A new publication by IUCN offers guidelines for deliberately moving plants and animals for conservation purposes around the world. Published by the Reintroduction Specialist Group and Invasive Species Specialist Group of the IUCN Species Survival Commission; *Guidelines for Reintroductions and Other Conservation Translocations* explores the biological, social, and political aspects of translocating species, and provides a starting point for risk assessment and feasibility studies.
http://www.iucn.org/?uNewsID=13519

Saving Springer
The NOAA documentary, Saving Springer, is a story about the work that the NOAA Fisheries Office of Protected Resources, does on a daily basis. It is about a young killer whale and the dedication of NOAA professionals helping return her to her family. It will air on 90 public television stations around the nation over the next several months. The next airings are Mobile, Alabama/Pensacola, Florida, on November 14 and 17, 2004, and Champaign, Illinois on November 14 and 18, 2004.
Check local Public Broadcast Stations.

Saving Sturgeon
Sturgeon are unusual fish that have changed very little since prehistoric times. Learn about this living dinosaur and their fight for survival in the Bridge Data Analysis Teaching Activity (DATA), *Saving Sturgeon*. Students will explore Virginia Institute of Marine Science data that evaluates the interaction of sturgeon with the commonly used gill net. These nets, which can stretch for tens to hundreds of meters, trap fish by entangling them as they try to swim through the net. This DATA can also be used to investigate by-catch and its effect on slow-to-mature species.
http://www.marine-ed.org/bridge/index_archive1107.html

Saylor.org
Saylor.org is an open collection of over 200 free, self-paced, automated, peer-reviewed college level courses. Participants earn a certificate upon completion of each course. The setup of the courses offers a structured approach. Courses include biology, mathematics, and more, with a current focus on the undergraduate college level. Authors: check the website for the Open Textbook Challenge.
http://www.saylor.org/

Scaling Up Marine Management: The Role of Marine Protected Areas
This report from the World Bank assesses factors likely to determine marine protected areas' success and identifies opportunities for the bank and its partners to scale up MPA implementation to meet global conservation targets. The report focuses on how best to capture the potential benefits of MPAs for helping the world's poor while addressing the sociocultural and political realities of restricting access to the sea and regulating what has traditionally been considered common property.
http://siteresources.worldbank.org/INTCMM/Publications/21108865/Final_Printed_Version_MPA_ESW.pdf

Scaling Weather – Northeast Snowfall and Tornadoes
NOAA has devised two enhanced scales for rating severe weather phenomena – northeast US snowfall impact, and an enhanced Fujita scale for tornadoes. NESIS, or the Northeast Snowfall Impact Scale, calculates the impact of a powerful snowstorm soon after it strikes, giving it a rank similar to that given to tornado strength. The enhanced Fujita scale for tornadoes will continue to rate tornadoes from F0 to F5, but the range of wind speed in each category will now be more accurate and more variables will be taken into account, including building type, structure and trees.
http://www.ncdc.noaa.gov/oa/climate/research/snow-nesis/
http://www.spc.noaa.gov/efscale/

SCEC Education Module
The Southern California Integrated GPS Network completed an array of 250 continuously-operating GPS stations. The online education module offers information and activities on plate tectonics, earthquakes, and more using space technology to observe and measure tectonic motion of the Earth's surface.
http://scign.jpl.nasa.gov/learn/index.htm

Scholarly Repository
The University of Miami provides open access to the scholarly works produced by its faculty and researchers through the Scholarly Repository. Articles can be searched by research unit, author, and more. Units include the Rosenstiel School of Marine and Atmospheric Science, and the School of Education.
http://scholarlyrepository.miami.edu/

SCHOLARS Program from the National Climatic Data Center
The National Climatic Data Center (NCDC) hosted approximately 60 students for the unveiling of their educational CD and educational packets. The NCDC signature program, SCHOLARS (Serving Customers and Helping Others Learn through Applications Involving Remote Sensing), can also be viewed on the website. The students toured the museum, listened to presentations on both geostationary and polar orbiting satellites and experienced the Magic Planet.
www.ncdc.noaa.gov/oa/edu.html

School of Open
The School of Open offers free online courses, face-to-face workshops, and training programs on the subject of openness - in education, research, and science. Topics include Creative Commons licenses, open educational resources, and more. Training programs are offered in Spanish, English, and other languages. Check out dScribe: Peer-produced Open Educational Resources, How to use Open Educational Resources, and more.

http://schoolofopen.p2pu.org

Schoolyard Geology
The U.S. Geological Survey's Schoolyard Geology website offers activities and examples of what to look for to turn your schoolyard into a rich geologic experience. It introduces teachers to the possibilities for teaching geology to students in familiar, easily accessible, and personally relevant settings through a series of complete lesson plans. The website is divided into mapping your schoolyard, rock stories, and GeoSleuth Murder Mystery.
http://education.usgs.gov/schoolyard/

Schoolyard Habitats
The National Wildlife Federation assists schools in developing outdoor classrooms called Schoolyard Habitats®, where educators and students learn how to attract and support local wildlife. The downloadable How-To Guide for Schoolyard Habitats walks through the steps to creating a successful and sustainable wildlife garden, provides information on teaching in an outdoor classroom, and offers resources to help create and maintain the habitat.
http://www.nwf.org/schoolyard/

Schoolyard Wildlife Habitats Best Management Practices
The Georgia Wildlife Federation has been helping schools with schoolyard wildlife habitat since 1987. The program provides an outdoor classroom where students can apply what they learn in the classroom to the natural world. Many of similar projects have been difficult for schools to maintain over time. Tthe Georgia Wildlife Federation provides "Planning First to Make Your Outdoor Classroom Last; A Best Management Practices (BMP) Guide for Creating and Sustaining Outdoor Classrooms in Georgia."
www.gwf.org/bmpindex.htm

Schreyer Institute for Teaching Excellence: Tools for Teaching and Learning
The Schreyer Institute for Teaching Excellence at Pennsylvania State University has created this website to give educators access to a wide range of teaching and learning tools. Sections include Course Design and Planning, Teaching and Assessment Strategies, Tools for Course Evaluation, and more. Users can read and download specific activities geared towards syllabus improvement, writing effective and meaningful tests, and incorporating problem-based activities into the classroom.
http://www.schreyerinstitute.psu.edu/Tools/

Schweppe Public Lecture Series - Texas
The Laura Randall Schweppe Endowed Lecture Series in Marine Science at The University of Texas Marine Science Institute in Port Aransas, Texas, brings scientists to the institute to interact with its faculty, staff, and students. Upcoming lectures include The Marine Side of the Monarch Butterfly; Nitrogen: The Good, the Bad and the Ugly; and more.
https://utmsi.utexas.edu/visit/public-lectures/public-lecture-series

Science 2.0 Blog
This NSTA blog discusses digital tools for the classroom. As an online companion to NSTA's The Science Teacher's Science 2.0 column, it aims to help readers find resources, connect with colleagues, and share ideas.

http://nstacommunities.org/blog/category/science20/

Science 360
The Science 360 Knowledge Network uses multimedia to highlight science, engineering, technology and math. The website draws on work by the National Science Foundation and other institutions around the world. The website gathers the latest science videos provided by scientists, colleges and universities, science, and engineering centers. Topics include Earth & environment, K-12 & education, and more.
http://www.science360.gov/files/

Science
The peer-reviewed general-science journal *Science* is an outlet for scientific news, commentary, and cutting-edge research. The website offers the full text of the journal's news stories, research reports, and commentary articles in a searchable database. The website is enhanced by additional information, links, multimedia, and more; science jobs; science careers; and a Science Express area with selected original, peer-reviewed hot research weeks ahead of its print publication date.
http://www.sciencemag.org/

Science-to-Action Guidebook
The Science-to-Action Guidebook includes two guides in one publication. One guide is intended for scientists, and the other for decision-makers, with practical tips on how to best bring these worlds together. In doing so, this guidebook emphasizes the roles of facilitating, synthesizing, translating, and communicating science to inform conservation action.
http://www.science2action.org/index.php?option=com_content&view=article&id=159

Science Activities
The journal, Science Activities Classroom Projects and Curriculum Ideas, offers science projects and curriculum ideas for the K-12 classroom teacher. Written by educators, the articles cover a wide range of topics in the biological, physical, environmental, and behavioral sciences. Activities are teacher-tested, and regular departments include news notes (on exhibits, films, videos, and contests), classroom aids, and more. Check out the sample copy with free online access.
http://www.tandfonline.com/toc/vsca20/48/4#.U4ZmxSgUrpU

Science Activities and Curriculum
The Center for Coastal Margin Observation & Prediction, an NSF Science and Technology Center partnership of Oregon Health & Science University, Oregon State University, University of Washington and others, focuses on coastal margins. The website offers a collection of activities and curricula that can help you use their data resources. Check out the materials on coastal hypoxia, vertical density gradients, drifters and currents, and more. Materials are available in both English and Spanish.
http://www.stccmop.org/education/k12/teacher_resources/activityarchive

Science Animations
Practical demonstrations of various scientific principles may be difficult, if not impossible. North Harris College offers this website, which functions as a clearinghouse for science animations created by a wide range of institutions from the University of Hawaii to Cambridge University. Categories include ecology, plants, animals, with animations of the greenhouse effect, classification schemes, pond life videos, and more.

http://science.nhmccd.edu/biol/animatio.htm

Science Animations
Created by staff at North Harris Community College, this website offers animations in a number of topics, including plants, ecology, geology, and more. Each section contains links to animations from various institutions.
http://science.nhmccd.edu/biol/animatio.htm#ecology

Science Approach
Science Approach is dedicated to translating scientists' research and data into inquiry-based lessons for students. They offer a variety of educational materials including free, downloadable materials; registration is required. Check out the GIS lesson on zebra mussel distribution, sign up to become a reviewer, read about the CoastLines project to facilitate rapid deployment of GIS in schools, and more.
http://www.science-approach.com/

Science Behind the Scenery
This free DVD, *Science Behind the Scenery*, is available to middle school and high school educators from the Point Reyes National Seashore. The DVD explores the Science at Point Reyes National Seashore, Northern Elephant Seals, Coho Salmon and Steelhead Trout, Fire Management, Vegetation Mapping, and much more. English and Spanish subtitle options are included.
http://www.nps.gov/archive/pore/educate.htm

Science Behind Sustainable Seafood
The NOAA Fisheries Alaska Fisheries Science Center has developed this high school curriculum, the Science Behind Sustainable Seafood. The curriculum has six lessons that illustrate the importance of responsibly managing a natural resource and how scientific information is necessary to manage it responsibly.
http://www.afsc.noaa.gov/education/Activities/sbss_module.htm

Science Behind Sustainable Seafood
Join NOAA Fisheries Service and The Seattle Times Newspapers In Education for the series *Sustainable U.S. Seafood: What's Science Got to Do with It?* The five-part series is written for middle school level but can be easily adapted. Register to receive this series (for you and your students) for free by asking for the NOAA series.
Contact nie@seattletimes.com

Science Buddies
Science Buddies offers free science fair project ideas, answers, and tools for students and teachers. The project includes science and technology professionals interacting directly and indirectly with the students, making science real and helps lead students to projects that are more challenging and have greater science content than projects they might choose on their own.
http://www.sciencebuddies.com/

Science Bulletin Website
The Science Bulletin website, sponsored by the American Museum of Natural History, highlights breaking news on astrophysics, earth sciences, and biodiversity. The bulletins present current science news stories through interactive videos (5- to 7-minute video stories that follow scientists into the field), photographs, graphics (using 3-D computer

models), and interactive data visualizations (using NASA satellite data). Be sure to look through *Jellies Down Deep*.
http://sciencebulletins.amnh.org/ .

Science Careers
Science magazine from the American Association for the Advancement of Science (AAAS) offers this Science Careers website, with information and commentary on the state of the science workplace environment. The site is dedicated to furthering careers in science and technology, and offers a searchable science job database. In addition, visitors can check out the Forum to ask questions about future employment opportunities and career development, the Grants and Funding section, and much more.
http://sciencecareers.sciencemag.org/

Science In The Classroom
Science In The Classroom is a collection of annotated research papers and accompanying teaching materials designed to help students understand the structure and workings of professional scientific research, using articles from the magazine, *Science*. Articles are accompanied by discussion questions, links to related materials, teacher guides, and more.
http://www.scienceintheclassroom.org/

Science Comedian, Lab Out Loud
Brian Malow is a science comedian and video correspondent for Time.com. Check out the Lab Out Loud YouTube clips about walking into a bar and evolution. And while you're spending time with these short clips, check out the rest of the Lab Out Loud episodes.
http://laboutloud.com/2010/12/episode-55-science-comedian-brian-malow/
http://www.sciencecomedian.com/
http://laboutloud.com/

Science Demonstrations for Young Learners
Fun Science Demos, or Science Demonstrations for Young Learners, is a YouTube resource for teachers to use with science students. Each short demonstration is connected to a science concept highlighted in the NGSS. Categories include Earth/Space Science, Life Science, and Physical Science.
https://www.youtube.com/user/funsciencedemos

Science, Education, and Marine Archeology Program in Portugal (SEMAPP)
The Ocean Technology Foundation offers a submersible diving expedition to explore Portimao Canyon off the coast of Portugal from April 12-19, 2004. They will study the biodiversity and geology of the canyon and look for 14th-18th century shipwrecks from the Age of Exploration. The web offerings will include "Ask the Explorers," daily logs, and questions related to the expedition that can be turned into lessons for your students.
http://www.oceantechnology.org/semapp.htm .

Science & Engineering Festival – Washington, D.C.
The 3rd USA Science & Engineering Festival, April 26-17 in Washington, D.C., will feature over 3,000 interactive exhibits, stage shows, the first X-STEM extreme STEM symposium, and other exciting attractions. This event is free.
http://www.usasciencefestival.org/

Science Events At Your Fingertips
The National Science Teachers Association has an online calendar identifying science-related events and activities. This information includes programs, grants, and workshops in the field of science. Visitors can search by category, grade level, or region, and submit their own upcoming event.
http://www.nsta.org/main/calendar/events.php

Science Explorations
Science Explorations is a collaboration between the American Museum of Natural History and Scholastic, created to promote science literacy among students in grades 3-10. Science Explorations offers a series of online investigations featuring the latest scientific discoveries of the museum's experts. Upcoming investigations include invertebrates (in February) and reptiles (in May). The website includes a searchable database of lesson plans and activities, teaching tools, and more.
http://teacher.scholastic.com/activities/explorations/

Science Fair Season
Help your students plan, carry out, and present a great science fair project this spring with help from the Bridge. In our *Guiding Students* section you will find teacher-reviewed resources to help students get a leg up on the competition with annotated links to information on preparing a great project and tips for presenting it to the judges. Presentation information covers oral presentations, reports, and posters, and discusses the most effective way to convey experiments to the public.
Science Fair Resources http://www.marine-ed.org/bridge/index_student_res.html

Science Fairs Central
Discovery Education provides digital resources to schools and homes with the goal of making educators more effective, increasing student achievement, and connecting classrooms and families to a world of learning. They offer the Scotch Science Fair Central website, a resource center for science fairs.
http://school.discoveryeducation.com/sciencefaircentral/

Science for Citizens
ScienceForCitizens.net aims to bring together citizen scientists, projects, and the resources, products, and services that enable citizens to pursue citizen science activities. Check out projects, blogs, and more.
http://scienceforcitizens.net/

Science of Fire
QUEST is a TV, radio, web, and education series by KQED that explores science, environment, and nature in Northern California. This website with *Into the Inferno, The Science of Fire* offers great fire footage, information about fuel treatments, Smokey the Bear cartoons, and fire ecology. It goes inside the fire season, looking at how the history of forest management could be feeding today's flames. The website also offers links to additional fire resources.
http://www.kqed.org/quest/television/view/609

Science is Fun!
The *Science is Fun!* website includes sections on wildlife games, environmental science games, science fair projects, and much more. Links from the website include the Annals

of Improbable Research, The Yuckiest Site on the Internet, Bad Astronomy, and more, along with more conventional game and information websites. Check this one out.
http://science.house.gov/resources/science_fun.shtml

Science Friday Kid's Connection
Science Friday is a weekly National Public Radio show that discuses the latest research with science and policymakers. Science Friday Kids' Connection takes that material and turns it into science lessons for middle school kids. Each topic includes a summary of the discussion that took place on the show, resources, references, and more.
http://www.kidsnet.org/sfkc/

Science News for Kids
Science News for Kids is an online publication dedicated to students, their parents, and their teachers from Society for Science & the Public as a youth edition and companion to their *Science News* magazine. The website offers news stories and features accompanied by suggestions for hands-on activities, books, articles, and web resources. Major topics include Earth & Sky, Life, Tech & Math, and more. Check out the STEM Careers, use the quick search engine, and more.
http://www.sciencenewsforkids.org/

Science from the Poles
This site from the Exploratorium in San Francisco is designed to celebrate the start of the International Polar Year with webcasts that highlight the work of scientists at both the North and South Poles. Sections include presentations on climate change and another that focuses on the work of scientists who are constructing the largest telescope ever utilized in a polar region. In addition, users can view videos that address different themes, including sense of place, ice diving, penguins, and more.
http://www.exploratorium.edu/poles/index.html

Science Information for Teachers
The Science Information for Teachers (SIFT) List is a free e-mail subscription service for science educators to allow them to easily find information about useful internet sites categorized by topic, as well as professional development workshops and grant opportunities. Topics include Earth Science, Environmental Science, Physics, Astronomy, Biology, and Earth Science. The archive of the SIFT List entries are available in The Sifters Guide to Everything (Science).
http://history.cpet.ufl.edu/sift/SIFTHome.html
http://history.cpet.ufl.edu/siftguide/

Science of Marine Reserves Booklet Series
The Partnership for Interdisciplinary Studies of Coastal Oceans has released the latest booklet in its series on the science of no-take marine reserves. The new booklet summarizes current peer-reviewed knowledge and focuses on Europe, with several case studies from European MPAs. It also offers a Latin and Caribbean version. The series is available for downloading from the website.
http://www.piscoweb.org/publications/outreach-materials/science-of-marine-reserves

Science of Marine Reserves
The *Science of Marine Reserves* is now available online in an interactive format. The new educational layer in Google Earth, the MPA Layer, shows the locations of over 4000 MPAs around the globe. The case studies are highlighted in the layer through

interactive graphics, along with meta-analysis depicting responses inside marine reserves around the world. In addition, the expanded information from the case studies booklet is hosted on Protect Planet Ocean.
http://www.piscoweb.org/outreach/pubs/reserves
http://earth.google.com/outreach/kml_entry.html#tMarine%20Protected%20Areas
http://www.protectplanetocean.org/somr/effectsInside.html

The Science of Marine Reserves
The updated Science of Marine Reserves is offered by the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO). The booklet is now presented in two English versions: a U.S. version and an international version. These resources provide the latest scientific information about reserves in an understandable and accessible format. They are designed to be used by natural resource managers, government officials, scientists, and the interested public.
http://www.piscoweb.org/outreach/pubs/reserves

Science Matters
The Environmental Protection Agency publishes the *Science Matters* newsletter about its research and activities. The newsletter covers green chemistry, renewable energy, and much more. The Ask a Scientist feature profiles a different EPA scientist in each issue.
http://epa.gov/research/sciencematters/

Science Mentoring
The American Association for the Advancement of Science offers this website with access to their research on science mentoring. The goal of the site is to provide guidelines and resources for developing high quality research and evaluation studies for STEM career and workforce mentoring. The website offers resources for STEM mentoring along with announcements about upcoming awards and funding opportunities.
http://ehrweb.aaas.org/sciMentoring/index.php

Science Minded Blog
This new blog, initially written for the San Diego Union Tribune, aims to expose students, parents, and teachers to the world of science as a career. In addition to demystifying what scientists do through scientist profiles, there are tips for young scientists, kids in science, and more.
http://scienceminded.net/

Science Minutes
Science Minutes from Mote Distance Learning is a series of short videos that teach to National and Next Generation Sunshine State Science Standards. The video segments introduce basic science concepts and help prepare students for standardized testing. Topics include climate, tides, and more. Science Minutes includes a DVD of 10 science segments plus an online classroom guide and activity for each segment. Check out the online example on Weather.
http://www.seatrek.org/scienceminutes/

Science Nation
National Science Foundation's *Science Nation* is billed as the online magazine that's all about science for the people. The online magazine reports on science breakthroughs

and technological developments using video clips, first-hand reporting, written articles. Topics include tornadoes, climate change effects on Emperor penguin populations in Antarctica, and much more.
http://www.nsf.gov/news/special_reports/science_nation/index.jsp

Science Nation
The National Science Foundation offers Science Nation, a weekly series of video programs examining breakthroughs and the possibilities for new discoveries. Each program features a two-minute and five-minute version. Current videos include extremophiles, tornadoes, and more.
http://www.nsf.gov/news/special_reports/science_nation/index.jsp

Science NetLinks
Science NetLinks is a K-12 science education resource produced by the American Association for the Advancement of Science. The website offers free teaching tools, interactives, podcasts, hands-on activities, and more. Categories include lessons, collections, tools, science news, and afterschool. The materials are searchable by grade, theme, and content. Check this out.
http://sciencenetlinks.com/

Science Netlinks: Web Resources for Science Teachers
The American Association for the Advancement of Science website offers background information and useful resources for educators, including Science Books and Film; Science Careers; and Science Netlinks. Science NetLinks offers standards-based Internet resources for students including downloadable lesson plans and links to additional background materials and websites.
http://www.aaas.org/port_educators.shtml
http://www.sciencenetlinks.com/

Science News
Science News is the magazine of the Society for Science and the Public. Major topics include Earth, Environments, Science & Society, Science News for Kids, and more. The Bookshelf offers reviews of the latest science-oriented, books, while Multimedia offers videos and photo slideshows to explain scientific research. Issues can be read online; visitors can also subscribe to a variety of blogs.
http://www.sciencenews.org/

Science Now
NSF's Science Now is a weekly newscast covering some of the latest in NSF-funded research.
http://science360.gov/series/nsf-science-now/89a1b896-e8a7-4176-816e-08b4415308f8

Science Objects - Online
Science Objects, professional development from NSTA, are two-hour, online, interactive, inquiry-based content modules that help teachers better understand the science content they teach. Check out Ocean's Effect on Weather, Earth's Changing Surface, Plate Tectonics, and more. Many are available for free.
http://learningcenter.nsta.org/search.aspx?action=browse&subject=38

Science Oxford Live
Science Oxford Live offers podcasts on a wide range of science topics. Archived topics include Worst Science, FameLab (the search for the new faces of science communication), Earth's Changing Climate, Biodiversity, and many more. Sign up for the newsletter to find out about upcoming events.
http://www.scienceoxfordlive.com/watch-us

Science and Photography through the Microscope
Dennis Kunkel Microscopy, Inc. presents the Microscopy and Science Education Web Site. This site provides both a fine image bank for general use and general information about the art and science of this scientific field. The education image library database allows you to browse the contents by category or perform a search. Educators and students may request permission for image use through the website.
http://education.denniskunkel.com/

Science Reference Services
The Library of Congress Science Reference Services website hosts a myriad of useful and interesting information. The Everyday Mysteries offers archived questions and answers about questions you've thought about but never pursued. The Science Tracer Bullet Series contains research guides that help locate information on science and technology subjects. They offer brief introductions to the topics and lists of resources and strategies for finding more. For help with student science projects, the website offers a long list of useful references, both Internet and hard copy. Additional reference lists are provided for subjects such as The Crisis in Science Education, Selected Internet Resources for Teachers, and much more.
http://www.loc.gov/rr/scitech/

Science Review of Artificial Reefs
The Marine Sanctuaries Conservation Series provides a forum for publication and discussion of the complex issues the National Marine Sanctuary Program faces. A recent addition is *Office of National Marine Sanctuaries Science Review of Artificial Reefs.*
http://sanctuaries.noaa.gov/science/conservation/welcome.html

Science of Sand
This site contains sand samples from throughout the world. Visitors can click on a location and find pictures of the beach where the sand came from as well as magnifications and the reflectance spectrum of the sand for some samples. The website also links to lessons about sand, including Atlantic coast sand, geologic time project, and more.
http://www.scienceofsand.info/sand/sandintro.htm

Science and the Sea
Check out this website from the University of Texas Marine Science Institute in Port Aransas. You will find 2-minute radio broadcasts, information about marine debris and man-made structures in the sea, quizzes, and more.
http://scienceandthesea.org/

Science of Science Communication II
This downloadable publication from the National Academies Press offers advice on how to identify information needs, engage the public, navigate the politicization of scientific

findings, and more. Chapters include The Sciences of Communication, Science in a Time of Controversy, Creating Collaborations for Communication, and more.
http://www.nap.edu/catalog.php?record_id=18478

Science Since the Spill
COSEE teamed with the Smithsonian Institution's National Museum of Natural History to host a scientific panel focused on the Gulf of Mexico 2010 oil spill, Science Since the Spill: One Year After the Deepwater Horizon Oil Disaster. In this archived webcast, watch experts discuss what happened, what we have learned, and the current status of the Gulf of Mexico one year after the Deepwater Horizon oil spill began.
http://ocean.si.edu/ocean-news/changing-tides-series-ocean-discussions

Science Since the Spill
Changing Tides: A Series of Ocean Discussions by Smithsonian's Museum of Natural History and the COSEEs, 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. *Science Since the Spill: One Year After the Deepwater Horizon Oil Disaster* will be presented April 19, 2011.
http://ocean.si.edu/ocean-news/changing-tides-series-ocean-discussions

Science Snacks
The Exploratorium: Museum of Science, Art and Human Perception in San Francisco offers *Science Snacks*, miniature science exhibits that teachers can make using common, inexpensive, easily available materials. The Snacks are divided into easy-to-follow sections that include instructions, advice, and helpful hints. Most of the Snacks can be completed by one person. A section called "etc." offers interesting bits of additional scientific and historic information.
http://www.exploratorium.edu/snacks/index.html

Science as Storytelling
This classroom exercise was peer-reviewed by participants at the *Preparing Teachers to Teach Earth Science* Workshop at Carleton College, and was authored by B.R. Bickmore and D.A. Grandy of Brigham Young University. The exercise can help students gain a more sophisticated conception of the nature of science. The site contains teaching notes and tips, learning goals, and the essay.
http://serc.carleton.edu/teacherprep/resources/activities/storytelling.html

Science Sunday - California
The Seymour Center at Long Marine Lab in Santa Cruz, California offers Science Sunday lectures on the third Sunday of the month.
http://seymourcenter.ucsc.edu/calendar.html#MonkSeal

Science Today
Science Today is a one minute radio program produced by the University of California. The website provides the program on demand, in audio and text, as well as the archives for the program. Visitors can also browse by subject, including air quality, oceanography, and more, and get more in-depth information through the features, including marine mammal, global warming, and fire issues.
http://www.ucop.edu/sciencetoday/index.php

Science Tracks Downloads From Teachers' Domain
Teachers' Domain offers free science track downloads for IPods. Topics available include Life Science, Earth and Space Science, and more. Resources available for download include videos and educator guides with discussion questions, background essays, and additional materials.
http://deimos3.apple.com/WebObjects/Core.woa/Browse/wgbh.org

Science360 App
The National Science Foundation's free Science360 for iPad provides easy access to science and engineering images and video from around the globe, and a news feed featuring breaking news from NSF-funded institutions.
https://itunes.apple.com/app/science360-for-ipad/id439928181?mt=8

ScienceEducation.gov
ScienceEducation.gov is a portal for federal agency resources on science, technology, engineering, and mathematics education content. The website includes lesson plans, curricula, classroom activities, professional development, and more. Searches can be filtered by resource type, grade level, and agency. This is a newly released website and changes and additions will continue to be made.
http://www.scienceeducation.gov/

Science.gov Image Search
Science.gov Image Search searches the metadata from images provided by three Federal agencies, with more image databases expected to be added in the future. The current search includes The National Biological Information Infrastructure Library of Images from the Environment, the NASA Image eXchange, and the NOAA Photo Library.
http://www.science.gov/scigovimage/

Scientific Committee on Antarctic Research
The Scientific Committee on Antarctic Research is charged with initiating, developing and coordinating high quality international scientific research in the Antarctic region. This website will be a useful research site for those interested in the International Polar Year. The Publications section of the website includes many downloadable resources, including topical articles addressing sea-level changes and climate transformation and a link to the Antarctic Digital Database for GIS users.
http://www.scar.org/

Scientific Poster Design
Cornell Center for Materials Research offers this document on how to design scientific posters.
http://www.cns.cornell.edu/documents/ScientificPosters.pdf

Scientific Principals
NSTA offers a complimentary, monthly e-newsletter written especially for elementary school principals, dedicated to helping their teachers in science. Scientific Principals offers a science toolbox of new ideas and practical applications.
http://science.nsta.org/scientific_principals/

Scientific Visualization Studio
NASA's Scientific Visualization Studio facilitates scientific inquiry and outreach within NASA programs through visualization. The studio works with scientists in the creation of visualization products, systems, and processes in order to promote a greater understanding of Earth and Space Science. Animations include hurricane upwelling, island underwater flybys, beach erosion, and much more.
http://svs.gsfc.nasa.gov/index.html

Scientists Cards
The U.S. Forest Service offers the Scientists Card series, a set of trading cards that can be printed and used in the classroom. These cards show kids what scientists look like, what they do, and give advice for students. The website also offers a lesson plan example, showing how the cards can be used in the classroom.
http://www.naturalinquirer.org/scientists-v-92.html

The Scientist Is In – Washington, D.C.
Each week (generally on Wednesday), a marine scientist is stationed in the Sant Ocean Hall at Smithsonian's National Museum of Natural History in Washington, D.C. as part of the *Scientist Is In* program. Check out the website for brief biographies of the visiting scientists.
http://ocean.si.edu/ocean-news/scientist

Scientists Making an Impact
Scientists working with COSEE generate and disseminate research-based programs, tools, publications, and other intellectual property in educational settings. This website will introduce you to scientists who are achieving broader impacts for their research through their involvement with COSEE's education and outreach programs. Three of the case studies are complete; check back often for further profiles.
http://www.cosee.net/engaging_scientists/

Scifund Challenge
Check out the latest round of the #Scifund Challenge - where scientists use crowd-sourced funding to support their research.
http://www.rockethub.com/projects/scifund

SciGuides
The National Science Teachers Association offers SciGuides™ as an online "science toolbox". The SciGuides tools allow teachers to quickly locate targeted science content information and teaching resources from NSTA-reviewed science websites. Teachers can also use SciGuides to transform science content into effective classroom resources by locating and incorporating online lesson plans and providing tips for teaching the content and examples of effective student assessments.
http://www.nsta.org/main/SciGuides

SciJinks
SciJinks is a joint NOAA and NASA educational website about weather and other Earth science topics, targeting middle and high school students and educators. Search for articles and activities that match the standards' disciplinary core ideas, science and engineering practices, or cross-cutting concepts. Topics include weather, tides and oceans, seasons, and more. Check out the games including Weather Tricktionary, the Bad (Weather) Joke Machine, and much more.

http://scijinks.jpl.nasa.gov/

SciLinks about Squids
SciLinks are normally available to NSTA members only, but links to a variety of marine animal information have been made available to all for a brief period of time. Browse through the links for animal diversity, mollusks, squid, pond scum, and more. Be sure to look at "Octopus Walking".
http://www.scilinks.org/retrieve_outside.asp?sl=74456611444466$7445773311$9911551066

SciLinks Assignment Tool
SciLinks®, NSTA's Internet referencing system, now features a new Assignment Tool to help teachers create and review student online assignments, and help gauge student progress. SciLinks is accessible using print-linked codes found in many textbooks, NSTA Press books and journals, and independently as a benefit for all NSTA members.
http://science.nsta.org/nstaexpress/nstaexpress_2004_05_10_extra.htm .

SciLinks on Weather and Global Warming
NSTA's SciLinks program links teachers and students to teacher-approved web sites to support science instruction. While SciLinks is primarily offered through the pages of science textbooks and NSTA Press publications, NSTA Express is making three popular topics available for free access, for a short period of time.

- What is Weather? (K–4)
  http://www.scilinks.org/retrieve_outside.asp?sl=63823447142110221066
- Measuring Motion (5–8)
  http://www.scilinks.org/retrieve_outside.asp?sl=63823447145510221066
- Global Warming (9–12)
  http://www.scilinks.org/retrieve_outside.asp?sl=63823447149910221066

SciJinks Weather Laboratory
NOAA and NASA offer the SciJinks Weather Laboratory, an interactive web site for middle school students, teaches about predicting weather patterns. The Educators link at the bottom of the page offers suggestions on how to use the SciJinks resources in the classroom.
http://scijinks.jpl.nasa.gov/weather/

SciJinks Web Comic
SciJinks offers this web comic series highlighting the scientific adventures of a revolving cast of intrepid weather explorers. Theo is a curious kid with a taste for science hijinks, and is guided by Bill, a serious-minded groundhog and mentor.
http://scijinks.jpl.nasa.gov/comic1/

SciPacks
SciPacks from the NSTA Learning Center are 10-hour online learning experiences that teachers can use to help better understand the content you teach. SciPacks are aligned with the National Science Education Standards. Select SciPacks are available at no charge, with topics including weather and climate, plate tectonics, water, and much more.
http://learningcenter.nsta.org/products/scipacks.aspx

SciStarter
This website is for teachers, parents, and kids of all ages who want to contribute to scientific work through recreational activities and research projects. Scientists share their work and citizens can get involved through projects that encourage tinkering, building, and exploring. Projects can be searched by topic, location, and more. Check out iSeeChange (climate experiences), Tag A Tiny, and more.
http://scistarter.com/

S'COOL - Students' Cloud Observations On-Line
Students' Cloud Observations On-Line (S'COOL) is a project which involves school children in real science. The CERES (Clouds and the Earth's Radiant Energy System) is a high priority scientific satellite instrument orbiting the Earth which scientists use to study the ways clouds may affect the Earth's climate. S'COOL Students provide ground truth measurements to assist in the validation of the CERES instrument. They also compare the surface- and space-based observations to learn about clouds and climate.
http://asd-www.larc.nasa.gov/SCOOL/pamphlet.html
http://asd-www.larc.nasa.gov/SCOOL/SCOOL.html

The Scoop on Soil
The National Geospatial Development Center presents educational pages featuring "The Soil Game," hands-on educational materials, posters, lesson plans, and links to other soil-related resources. *The Scoop on Soil* is an interactive game for elementary grades; the website includes a related 4th grade lesson plan.
http://www.ngdc.wvu.edu/~hferguson/educationNGDC/

Scuba Explorers
Scuba Explorers is a program for middle school and high school students to promote exploration of the marine sciences. Students are not required to purchase any equipment - all equipment is supplied including mask, fins, and snorkel. Students have the opportunity to take part in community service projects, participate in other water related activities, meet guest speakers from various maritime related careers, and participate in field trips to explore the many opportunities in the maritime industry.
http://www.scubaexplorers.org/

SCUBA Scouts
The SCUBA Scouts were started in 2001 and provide project leadership for the Coral Reef Evaluation and Monitoring Program in the Tampa Bay, Gulf of Mexico, and Florida Keys. The SCUBA Scouts train in advanced SCUBA and scientific diving to observe underwater phenomena relating to artificial coral reefs and to acquire the scientific data. They receive training and mentorship from Florida Fish and Wildlife Research Institute and other professional research scientists and graduate students conducting research.
http://scubascouts.org/

SCUBAnauts International
SCUBAnauts International is an informal marine education program focused on engaging youth (ages 12-18) in the marine sciences through research projects. The website offers downloadable presentations, publications, and more.
http://www.scubanautsintl.org/

SCUTES Educational Resources
The SCUTES program is the collaboration between NOAA Fisheries, sturgeon researchers, teachers, and informal educators to bring more awareness about Atlantic and shortnose sturgeon to the classroom. The website offers information for students and teachers, along with activities and lesson plans, games, and much more.
http://www.nero.noaa.gov/prot_res/scutes/workshop.html

Scuttlebutt
Ocean science educators can talk informally about marine education ideas, issues, and questions on "Scuttlebutt", the Bridge email discussion list. The listserv is monitored by Bridge staff, who also locate expertise for posted questions as needed. All educators and scientists interested in marine science education are invited to subscribe. Scuttlebutt is a unique list, just for marine educators and researchers interested in marine education.
http://www.vims.edu/bridge/index_scuttle.html

Sea Aggie Preview for Prospective Students - Texas
The Office of Student Relations of the Texas A&M University at Galveston (TAMUG) held its Fall Sea Aggie Preview as an opportunity for prospective university students and parents to visit the campus to learn all about the opportunities at TAMUG to study ocean-oriented academic programs in transportation, science, engineering, business and liberal arts at the by-the-sea campus. Research and public service involve the Gulf of Mexico and Galveston Bay, which border the island campus.
http://www.tamug.edu/admrc/preview/Sea%20Aggie%20Preview/index.htm

Sea Around Us
The Sea Around Us Project provides an integrated analysis of the impacts of fisheries on marine ecosystems, and to devise policies that can mitigate and reverse harmful trends whilst ensuring the social and economic benefits of sustainable fisheries. The website includes Internet GIS maps, background information, and downloadable reports, including *Competition between Marine Mammas and Fisheries: Food for Thought* and *Seamounts: Biodiversity and Fisheries*.
http://www.seaaroundus.org/project.htm
http://www.seaaroundus.org/BooksReportsF.htm

Sea Change
Sea Change is the Seattle Times's long-running series on ocean acidification's impact on the Pacific Ocean. Read the stories, check out the photos, and more on this website.
http://apps.seattletimes.com/reports/sea-change/2013/sep/11/pacific-ocean-perilous-turn-overview/

Sea Cucumber Podcast and Google Earth Tour
Follow host Ari Daniel Shapiro from a Chinatown market to the reefs of Fiji to learn more about Sea Cucumbers in this dual Podcast of Life and Google Earth Tour, from the Encyclopedia of Life.
http://education.eol.org/podcast/sea-cucumbers-0

Sea Ducks of Alaska
The Center for Alaskan Coastal Studies has developed a hands-on activity guide for grades 4-6 on the Sea Ducks of Alaska. The guide offers teacher background information and teaching activities that explore sea duck adaptations, their role in food

webs, provides an opportunity to research Alaskan species, and looks at conservation issues.
www.akcoastalstudies.org

Sea Education Association K-12 Lesson Plans
The Sea Education Association offers at-sea experiential programs with shore and sea components to develop students' and teachers' ability to apply scientific thinking and method to the marine environment. Lesson plans are posted for teachers to help bring the ocean into the classroom. Topics include marine biology and ecology, geological and physical oceanography, and nautical science, listed by grade level and topic.
http://www.sea.edu/k12LessonPlans/k12pgmtop.htm

Sea Floor Mapping
NOAA's Ocean Service Communications and Education Division, in cooperation with NOAA's Office of Coast Survey, launched this new educational offering, Sea Floor Mapping. Designed for students in grades 3-5, the activity teaches young people about mapping the sea floor and why it is important. The website includes the online activity, movies and pictures, background information, and more.
http://oceanservice.noaa.gov/education_new/seafloor-mapping

Sea Grant Reporter
The University of Delaware, College of Marine Studies' annual Sea Grant Reporter provides an update about its research and educational activities as a Sea Grant institution, encouraging Delawareans to become informed, become involved and stay connected through the various programs of the college. In addition, public input is sought on coastal issues through a survey; the publication also lists volunteer opportunities.
www.ocean.udel.edu/publications/Newsletter/reporter/2005/

Sea Ice
NASA's Earth Observatory features an article on sea ice in the Arctic and Antarctic, including background information, monitoring, references, and more.
http://earthobservatory.nasa.gov/Features/SeaIce/

SEA K-12 Lesson Plans
SEA Semester's K-12 lesson plans cover topics in marine biology, coastal ecology, chemical and physical oceanography, seafloor geology, and nautical science. Each plan includes target grades, introduction and background, advice on how to best integrate the activities into classroom curriculum, and more.
http://www.sea.edu/academics/k12.aspx

Sea Level Affecting Marshes Model
The U.S. Fish and Wildlife Service has posted simulations of sea-level rise impacts for several coastal estuaries online on this website. The simulations are the product of the landscape-change model which uses existing wetland, land use, and elevation data combined with local information on subsidence, accretion, and other factors, along with a variety of projections of sea level rise to predict the effect of 45 different sea-level rise scenarios on coastal marshes and shorelines.
http://www.fws.gov/slamm/

Sea Level from Space
NASA's Jet Propulsion Laboratory offers the Ocean Surface Topography From Space website. Continuous data from satellites like TOPEX/Poseidon and Jason help us understand and foresee the effects of the changing oceans on our climate. The website offers an education section with links to interactive exhibits, classroom activities, and much more. Other website features include news, mission information, a gallery, and more.
http://sealevel.jpl.nasa.gov/index.html

Sea Level Rise and Coastal Flooding Impacts Viewer
NOAA's Coastal Services Center's Sea Level Rise and Coastal Flooding Impacts Viewer now includes all coastal counties in Texas, Mississippi, Alabama, and the Gulf Coast of Florida; new regions will be added in the future. This Digital Coast tool features coastal flooding scenarios coupled with photos of well-known locations that illustrate potential inundation; uncertainty maps; flood frequency information; and social and economic vulnerability information.
http://www.csc.noaa.gov/digitalcoast/tools/slrviewer/

Sea Level Rise Conference Online
The International Conference on Sea Level Rise in the Gulf of Mexico took place March 1-3 in Corpus Christi, Texas. The oral presentations and recorded videos of sessions are available online for downloading.
http://www.sealevelrise2010.org/video/
http://www.sealevelrise2010.org/oral%20Presentations.htm

Sea Level Rise Impacts Viewer
NOAA's Coastal Services Center has released the Sea Level Rise Impacts Viewer, a tool for visualizing sea level rise and coastal flooding. While it is currently available for coastal Mississippi and Texas' Houston and Galveston metro areas, the tool will be expanded for use in other geographic areas in the near future. Features include coastal flooding scenarios, uncertainty maps, social and economic vulnerability information, and more.
http://csc.noaa.gov/digitalcoast/tools/slrviewer/

Sea Level Rise Viewer
NOAA's Digital Coast lets you see how sea level rise might impact your coastal community with the visualization tool, the Sea Level Rise Viewer. Completed areas include Mississippi, Alabama, Texas, Florida, and Georgia, with additional coastal counties to be added in the near future. Visuals and the accompanying data and information cover sea level rise inundation, uncertainty, flood frequency, marsh impacts, and socioeconomics.
http://www.csc.noaa.gov/digitalcoast/tools/slrviewer

Sea Level Trends
The Bridge Data Analysis Teaching Activity: Sea Level Trends is designed as an introductory activity exploring just one facet of global climate change. Students will access real scientific data to investigate and compare long-term changes in sea level from different coastal locations around the United States.
http://www.marine-ed.org/bridge/sealeveltrends.html

Sea Monsters: A Prehistoric Adventure Movie
National Geographic and the National Science Foundation offer *Sea Monsters: A Prehistoric Adventure Movie*. This website provides photos and video clips from the movie about creatures that roamed the seas 82 million years ago. Discover sea monsters of the past and present using the interactive timeline. Excavate fossils on a "virtual dig." The website links to lesson plans and more.
http://www.nationalgeographic.com/seamonsters/

Sea Otter Unit
Kids' Planet from the Defenders of Wildlife offer this teacher's manual on sea otters, including lesson plans on using the web as a research tool; reading and developing writing skills; and a role playing activity in community conflict resolution. The materials Include background materials on sea otters, links to additional resources, and more.
http://www.kidsplanet.org/tt/seaotter/home.html

Sea Partners Campaign
The U.S. Coast Guard Sea Partners Campaign is an environmental education and outreach program. Its aim is to develop community awareness of maritime pollution issues and to improve compliance with marine environmental protection laws and regulations. For more information about local Sea Partners efforts, contact your nearest Coast Guard Marine Safety Office or Captain of the Port. The directory is available for downloading from the first website.
http://www.uscg.mil/units.html
http://www.uscg.mil/hq/g-m/nmc/seapart.htm

Sea Search
Sea Search is a monitoring program for community groups volunteering in Victoria, Australia's Marine National Parks and Sanctuaries. Volunteers can explore and learn about the diversity of marine plants and animals found in Victoria's marine protected areas while adding to the scientific knowledge of the parks. Community and school groups work with park rangers and a project officer to collect seasonal data in their local MPA and at nearby control sites. The website includes an overview document for community-based monitoring, individual guides for intertidal, subtidal, and seagrass monitoring, data entry sheets, and field fact sheets. *MPA News #81* (at http://www.mpanews.org) includes a discussion about the program, challenges faced, and lessons learned.
http://www.seasearch.org.au/index.htm

Sea & Ships
The goal of the National Maritime Museum in England is to illustrate the importance of the sea, ships, time, and the stars and their relationship with people. The Sea and Ships Directory divides the material up by Subjects, People, Collections, Online Galleries, and Games and Interactives. Check out the Your Ocean link from the Games and Interactives. The *Your Waste* lesson gives visitors the opportunity to test their skills at managing an oil spill clean-up operation; other interactives include *Your Climate*.
http://www.nmm.ac.uk/explore/sea-and-ships/

Sea of Sound
The Sea of Sound DVD from the Cornell Lab of Ornithology immerses viewers in the world of underwater sound with imagery, sound, and computer graphics. The DVD comes with eight standards-based classroom activities for 7-12th grade physics and

biology courses, sound analysis software, and marine sounds. The website offers a downloadable Educator's Guide, along with additional materials.
http://www.birds.cornell.edu/Page.aspx?pid=2207

Sea Stories
The Sea Stories Project, an international initiative of the Blue Ocean Institute, accepts first-person writing and art about the sea, coast, and sea-life from ocean-lovers of all levels and backgrounds. Memoirs, essays, poetry, and imaginative nonfiction are all welcome, as are photographs, drawings, or other visual arts. The inaugural issue of Sea Stories is now online, devoted to nurturing appreciation and concern for the world's oceans through writing, art, and conversation.
http://www.seastories.org/
http://www.seastories.org/current.html

Sea to Shining Sea – Partners in Conservation Webcast from Texas and Alaska
The *Sea to Shining Sea – Partners in Conservation* webcast, November 14, 2003, covers global topics and issues from Alaska to Texas. It is divided into three major topical areas: A Sense of Place: Understanding the Habitat; Wildlife: Adaptations and Concerns; and Human Impact and Involvement. Topics, guiding questions, curriculum standards, Internet resources and activity ideas are included online.
http://www.tpwd.state.tx.us/expltx/eft/seacenter/guide.phtml

Sea Stars
The Discovery Hall at the Dauphin Island Sea Lab offered Sea Stars, a free, three day buddy camp designed for students with special needs and their guardians to explore the Gulf of Mexico. While at the Sea Lab, students and their guardians explored the various coastal habitats of Alabama with marine educators. The weekend included a 2 hour cruise aboard the *RV Alabama Discovery,* the Sea Lab's education vessel.
http://dhp.disl.org/seastars.html

Sea Talk
As a public service in conjunction with more than 35 area radio stations, Delaware Sea Grant produces SeaTalk, a bimonthly series of 30- and 60-second radio announcements on subjects ranging from sharks to sand dunes to current marine science research. The series has been in production at the University of Delaware for more than 30 years. You can download audio clips, read the scripts, and subscribe to podcasts.
http://www.ocean.udel.edu/seagrant/seatalk/

Sea Turtle Conservancy
The mission of the nonprofit Sea Turtle Conservancy, formerly known as the Caribbean Conservation Corporation, is to ensure the survival of sea turtles through research, education, training, advocacy, and protection of the natural habitats upon which they depend. The website offers many resources for educators, including background information, turtle tracking, cool stuff for kids, an educators' guide and lessons, and much more. Check out the downloadable posters, volunteer opportunities, and more.
http://www.conserveturtles.org/

Sea Turtle Curriculum
NOAA's Southwest Fisheries Science Center offers a downloadable Sea Turtle Curriculum for 6th Graders, compiled by a veteran teacher who has taken part in

Teacher at Sea, in the Air, and in the Lab programs. The materials include lessons, resource lists, links to additional websites, videos, and much more.
http://swfsc.noaa.gov/uploadedFiles/Education/Sea%20Turtle%20Curiculum%20Complete-10-26-09.pdf

Sea Turtle eFieldTrip
The U.S. Fish and Wildlife Service has sponsored *Sea Turtles: Endangered Ocean Navigators,* an eFieldTrip on Sea Turtles. Have your students visit Pea Island National Wildlife Refuge and learn about these amazing animals. 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.
www.eFieldTrips.org

Sea Turtle Husbandry Manuals
WIDECAST (Wider Caribbean Sea Turtle Conservation Network) offers various manuals for sea turtle husbandry, including an injury response field guide (in English and Spanish), a handbook for veterinarians, and more.
http://www.widecast.org/What/Regional/Medicine.html

Sea Turtle Migration-Tracking and Coastal Habitat Education Program
A program of Caribbean Conservation Corporation, this Sea Turtle educator's guide provides information about sea turtle natural history, coastal habitat ecology, high technology research, and conservation efforts to protect sea turtles and their habitats. The guide can be used as a reference to teach sea turtle biology and coastal ecology and offers marine background material and lesson plans. The guide is downloadable for free in English and Spanish (registration is required).
http://www.cccturtle.org/satellitetracking.php?page=educatorsguide

Sea Turtle Migration-Tracking Education Program
The Sea Turtle Migration-Tracking Education Program is an educational service of the Sea Turtle Survival League, part of the non-profit Caribbean Conservation Corporation. Through this website, you can view maps showing the migratory movements of endangered sea turtles being tracked by satellite. In addition, the site offers a downloadable Educator's Guide, background information about sea turtles; tips on how to make the best use the program; and classroom activities.
http://www.cccturtle.org

Sea Turtle Resources
SEE Turtles is a non-profit ecotourism project. In addition to study trips, they offer lesson plans, in-class presentations, and other education resources. The curriculum was teacher-developed to engage students from grades 6-12 on various subjects related to sea turtles.
http://www.seeturtles.org/1352/classroom-resources.html

Sea Turtles
The Caribbean Conservation Corporation has updated the Sea Turtle Information section of their website. This includes an expanded section on threats to sea turtles, educational animations, additional sea turtle habitat information, and interactive sea turtle nesting site maps powered by Google Maps.
http://www.cccturtle.org/seaturtles

Sea Turtles Resources
Check out these sea turtle web resources
http://www.sefsc.noaa.gov/seaturtlepublications.jsp .
http://www.nmfs.noaa.gov/prot_res/PR3/Turtles/symposia.html .
http://www.floridamarine.org/features/view_article.asp?id=2156 .
www.widecast.org .
http://www.ex.ac.uk/~pcthornt/EuroTurtle/homep.htm .
www.seaturtles.org .
www.seaturtle.org/mtn .
www.floridaleatherbacks.com .

Sea Turtles: An Ecological Guide
This book features more than 350 color photos and original graphics to illustrate basic concepts of taxonomy, ecology, and physiology, as well as human impacts and conservation. A unique reference for naturalists, divers, eco-tour operators, resource managers and policy-makers, the book is also designed to be used as a text. The authors are currently working on a Teacher's Resource Guide, which will be available at no charge to anyone who orders 10 or more copies of the book for classroom use.
Dr. Karen Eckert at keckert@widecast.org

Sea Turtles Teacher's Activity Manual
The authors of the textbook, "Sea Turtles: An Ecological Guide" which features more than 350 color photos and original graphics to illustrate basic concepts of sea turtle taxonomy, ecology, and physiology, as well as human impacts and conservation, have revised and reprinted the accompanying Teacher's Activity Manual. The Activity Manual brings these concepts alive with field, lab, and classroom activities that are easy to implement and adaptable to any age.
Contact Karen Eckert at keckert@widecast.org

Sea Unseen
NOAA's Northwest Fisheries Science Center's Sea Unseen - Scanning Electron Microscopy project offers links to images, videos, and educational resources.
http://www.nwfsc.noaa.gov/sem/index.cfm

Seabean Website
The purpose of this web site is to educate people about sea-beans - their identification, source, travels, variety, beauty, and the plants that they produce. This website contains images and information about sea-beans (drift seeds) commonly found on the beaches of the Northwest Atlantic Ocean.
http://www.seabean.com/

Seabird Aware Brochure
As animals of the open ocean, seabirds are important allies in the effort to conserve ocean environments. To encourage kayakers, pilots, fisherman, and others to respect the sensitive nature of seabirds, PRBO Conservation Science has developed a brochure that identifies the problem of disturbance to seabirds and simple solutions that can reduce human impact. This brochure and website will help to prevent disturbance to seabirds during the sensitive breeding period.
www.prbo.org/seabirdaware .

Seabird Breeding Maps
OBIS-SEAMAP, Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations, is a spatially referenced online database aggregating marine mammal, seabird, and sea turtle observation data from across the globe. Interactive maps are now available for seabird breeding colonies for the Lesser Antilles. Data from field surveys conducted as part of the Seabird Breeding Atlas of the Lesser Antilles is now easily accessible, including records of invasive species where available.
http://seamap.env.duke.edu/dataset/418

Seafloor Characterization Cruise
Join NOAA for the latest National Centers for Coastal Ocean Science (NCCOS) research cruise to explore conservation areas in Puerto Rico. Visitors can watch video clips and access a wealth of supporting information and images for cruises from 2004 through the recent 2008 seafloor characterization cruise. The website includes background information, video, data, and scientist profiles. Some materials are also available in Spanish.
http://ccma.nos.noaa.gov/products/biogeography/usvi_nps/details.html#

Seafloor Explorer
The public is invited to help identify objects they see in images of the seafloor through the interactive website, Seafloor Explorer. The website is a collaboration between oceanographers studying seafloor habitats, web programmers, and social scientists. Visitors are asked to describe if they note any organisms; provide basic measurements; and more.
http://www.seafloorexplorer.org/

Seafloor Mapping Mission in the U.S. Caribbean
From March 28-April 16, 2011, the NOAA ship *Nancy Foster* undertook a seafloor mapping mission in the U. S. Caribbean. Read about the mission, view daily logs, and meet the mission scientists.
http://ccma.nos.noaa.gov/products/biogeography/usvi_nps/details.html

Seafood Watch Pocket Guides
The Seafood Watch program has launched a new pocket guide for the Southeast region and updated the West Coast pocket guide. The Southeast guide includes several new species such as tilefish, conch, mackerel, and mullet. Seafood Watch has also added or updated species reports to their website. To learn more about these new recommendations please visit the All-Fish List on their website. Seafood Watch recommendations are updated twice each year. Check out the latest information and download your pocket guide.
http://www.montereybayaquarium.org/cr/seafoodwatch.asp
http://www.seafoodwatch.org/cr/cr_seafoodwatch/ .

Seafood Watch Quiz
The Monterey Bay Aquarium offers a quick quiz on their Seafood Watch website. The on-line quiz is an entertaining way to teach about sustainable seafood. Note the great Sherman's Lagoon characters by Jim Toomey. While on the website, check out the regional seafood guides, newsletter, and more.
http://www.montereybayaquarium.org/cr/cr_seafoodwatch/sfw_quiz.asp

SEA-GEOFISH
The southeast geographic fishery-independent survey and historical (SEA-GEOFISH) database is a web-based mapping application presenting data from a long-term fishery survey conducted by the South Carolina Department of Natural Resources. The geographic database includes data collected during more than 30 years of research cruises, sampling fishes and fish habitat off the Atlantic coast of the southeastern U.S. The maps include distribution of fish species; data on abundance, diversity and more.
http://ekman.csc.noaa.gov/seageofish/seageofish.htm

Seagrass Activity
High School teacher Ryan Cilsick has posted a Google Docs Sea Grass Argumentation Lab using sea grass data collected from the Indian River Lagoon along the east coast of Florida. Links are included to the data, a teacher presentation, and more.
https://docs.google.com/a/noaa.gov/document/d/1W7ZoRtj2w9vDVD0KsOMrp0iNojGwvxXUGkzqnF3NYxg/edit

Seagrass-Watch News
Seagrass-Watch News is the official magazine of the global seagrass and assessment program. All issues are available online. The current issue includes a discussion of ten years of monitoring.
http://www.seagrasswatch.org/magazine.html

Seagrass Syllabus for Resource Managers
The World Seagrass Association, Seagrass-Watch, and Conservation International have developed the Seagrass Syllabus for resource managers, a new manual aimed at building knowledge and raising awareness of seagrass habitats.
http://wsa.seagrassonline.org/blog/archives/94

SeaHarmony
SeaHarmony aims to help ocean scientists interested in broadening the impacts of their research find potential collaborators in education, management, or community engagement. It is a social networking site for ocean science professionals, allowing members to find potential collaborators, post announcements, ask questions, and share resources about specific ocean science topics.
http://www.seaharmony.org/

Seahorse Poster
Project Seahorse has created a free educational poster on seahorses and marine conservation. *Take Action for Seahorses and the Seas* is based on a map of the world and highlights four critical marine conservation issues: over-fishing, nonselective fishing, habitat damage, and poor land-use. Each conservation topic is linked with two seahorse species that exemplify the issue. The poster is targeted to 10-14 year olds, but should appeal to a broad audience interested in marine conservation.
Contact Heather Koldewey at heather.koldewey@zsl.org

SEAICEBOX Interactive Sea Ice Explorer
SEAICEBOX lets users view and measure changes in monthly sea ice concentration since 1979 in the Arctic and Antarctic regions. Users can view the latest daily image of sea ice concentration and compare changes in sea ice over time. The tutorial for first time visitors includes background information on sea ice and its importance to climate and also has student activities for exploring sea ice.

http://iceplanetearth.org/seaicebox/index.jsp

Seal Watch and Prudence Island Tour – Rhode Island
Explore Prudence Island, see seals at one of the best haul-out spots in Narragansett Bay, and learn about cutting edge ecological research in the bay. Narragansett Bay National Estuarine Research Reserve offers these outreach opportunities in April for groups of six to ten participants; registration is required.
http://www.nbnerr.org/seals.htm

Sealtag
Sealtag.org is an educational website about telemetry for sea lion research aimed at helping to discover how endangered Steller sea lions are dying. Students can learn about marine mammals and use their detective skills under Alaska Crime Scene Investigations. The website offers a Learning Resources section with free companion science and engineering curriculums for grades 6-12. The website offers a hands-on STEM curriculum aligned to Ocean Literacy Principles and Science Content Standards. Activities include learning how your cell phone acts like a transmitter, designing a seal tag, animal crime scene investigations, and more.
http://sealtag.org/TeacherToolbox.html
http://sealtag.org/

SeaMonster
SeaMonster is a blog about all things ocean - science and sports, creatures and ecosystems, conservation, and discovery. The website covers news in ocean sciences and the environment; oceans sports; plants, animals, and people that inhabit the oceans; ocean policy and conservation; and the funny, cute, crazy, scary, and weird. The site is designed to be educational with a mix of science content for all ages, focusing on stories with strong visuals. Watch for added content.
http://theseamonster.net/

Seamounts
The SeamountsOnline website provides data on species that have been observed or collected from seamounts worldwide. The online portal is designed to facilitate research into seamount ecology, and to act as a resource for managers. It is also the database component of the Global Census of Marine Life on Seamounts. The Seamount Catalog is a complementary but separate initiative that provides bathymetric maps on more than 1800 seamounts and data on their geology, rather than ecological data.
http://pacific.sdsc.edu/seamounts/
http://earthref.org/cgi-bin/er.cgi?s=sc-s0-main.cgi

SeaNET
COSEE-Alaska recently launched SeaNET, a network of ocean scientists, educators, and communicators involved in communicating about research in Alaska's seas. The goal is promoting ocean and climate change literacy, sharing best practices, and integrating ocean science with local and traditional knowledge. The website includes a calendar of upcoming events, science news briefs about recently published research, featured resources, and more.
http://oceanseanet.ning.com/

SeaPerch
SeaPerch is an underwater robotics program that trains teachers to teach their students how to build an underwater Remotely Operated Vehicle (ROV). Students build the ROV following a curriculum that teaches basic engineering and science concepts with a marine engineering theme. Check out the Teacher Tools for lesson plans and much more.
http://www.seaperch.org/index

SeaPhoto App
This free app for iPhones provides access to over 1,300 images of over 550 species of marine life of the Monterey Bay National Marine Sanctuary, including more than 130 species with detailed ecological information. The information is drawn from SIMoN, the Sanctuary Integrated Monitoring Network Photo Library, which offers over 4000 digital images.
http://itunes.apple.com/us/app/seaphoto/id515571588?mt=8

Seaquence
Seaquence is an experiment in musical composition using a biological metaphor. Visitors can create and combine musical lifeforms resulting in an organic, dynamic composition. The visual "creatures" can be manipulated as users are encouraged to add different elements to the creation "dish".
http://www.seaquence.org/

Search for the *Bonhomme Richard*
The Ocean Technology Foundation and Naval Historical Center are searching for one of the most famous ships of the Revolutionary War, the *Bonhomme Richard*, which was commanded by John Paul Jones. A survey expedition in the North Sea last summer revealed several shipwreck sites of interest, and another expedition is planned for this summer. This presentation highlighted the unique combination of history and modern technology that is being used to find this artifact of American maritime history.
http://www.oceantechnology.org/BHR.htm

The Search for Bonhomme Richard
The Ocean Technology Foundation offers this website in support of its June expedition to search for the *Bonhomme Richard*. The website offers lesson plans focusing on ocean technologies, careers in marine technology, and surveying a shipwreck site, appropriate for middle and high school levels and correlated with the NSES and Ocean Literacy Principles. There will be additional lessons created to continue the series. In addition, the website offers information about the expedition and the history of the battle.
http://www.oceantechnology.org/BHR.htm

Search for the Lost French Fleet of 1565
From July 14-August 18, 2014, a team of maritime archaeologists and partners embarked on a mission to discover the lost French Fleet of 1565. Using geophysical instruments to identify potential shipwreck targets, they conducted surveys of a five-mile long stretch of the Atlantic Ocean off the coast of Florida. Following analysis of the survey data, the archaeologists returned to the survey area to conduct diving operations. Check out the mission logs, educational materials, and more.
http://oceanexplorer.noaa.gov/explorations/14lostfleet/welcome.html

The Search for Trouvadore
This website from NOAA's Ocean Explorer offers insight into the July 2006 research and exploration cruise to seek the final resting place of Trouvadore, a Spanish slaver that wrecked offshore of East Caicos island 165 years earlier, bringing the direct ancestors of some of today's modern inhabitants to the islands. The website includes background information about slave trade and the ship's history.
http://oceanexplorer.noaa.gov/explorations/06trouvadore/welcome.html

Seas the Day
To complement, reinforce, and expand upon The Ocean Project's focus of helping their partners customize conservation for their visitors and members, this website features different conservation themes each month, with an emphasis on personal awareness and action. The new Seas the Day tools and products include the Seas the Day 2006 desktop calendar, with a new look and conservation content for each themed month.
http://www.theoceanproject.org/seas_the_day/

Seas the Day Conservation Calendar
The Seas the Day conservation education and action calendar is available from The Ocean Project. It helps one strengthen their connection with our ocean through inspiring underwater imagery and monthly tips on simple ways to take action. The calendar is available at wholesale rates for Ocean Project Partners and their staff.
http://seastheday.theoceanproject.org/seastheday/order/index.htm

Seas the Day Initiative
The Ocean Project, together with SeaWeb, launched *Seas the Day* to promote awareness and elevate importance of the ocean, and also to encourage people to take action to makes a difference for the health of our ocean planet. The initiative will include development of mission-driven products. The first product is a monthly calendar.
www.TheOceanProject.org .

Seas the Day Water Conservation
Seas the Day focuses on a different conservation theme each month, providing inspiration and information for taking conservation personally; August's theme is *water conservation*. The website offers useful background materials and links along with specific actions we can do to promote sustainability of our ocean resources. Check out the colorful Seas the Day Desktop Calendar as a promotional item for your organization.
http://seastheday.theoceanproject.org//2006/august.htm

Seascape Modeling
The Ecosystem Modeling Lab is a joint project of the University of Maine's School of Marine Sciences and the Gulf of Maine Research Institute. The Seascape Modeling website presents the news, results, and opinions from the lab on efforts to understand the link between physical and biological conditions in the ocean. Current project pages focus on ecosystem forecasting and sea surface photogrammetry.
http://www.seascapemodeling.org/index.html

Seascapes: Getting to Know the Sea Around Us
Quebec-Labrador Foundation's Marine Program offers this guide describing the process for developing a comprehensive compendium of information about coastal marine areas in the Gulf of Maine. Included is a description of each of the basic physical, biological,

and socio-economic components that together create a unique identity for any nearshore area in this region.
http://www.qlf.org/publications/seascapes.html

Seashells: the Plainness and Beauty of Their Mathematical Descriptions
Jorge Picado of the Universidade de Coimbra recently looked into the question of how seashells grow, and offers this very math-focused article. The author illustrates that many aspects of the growth of plants and animals may be described by simple mathematical laws.
http://mathdl.maa.org/mathDL/23/?pa=content&sa=viewDocument&nodeId=3294

Seashore Survivors eField Trip
The Alaska SeaLife Center launched *Seashore Survivors*, a virtual tour of Alaskan intertidal invertebrates. The tour focuses on the adaptations that intertidal animals need to brave the surf, tides, and predators. In addition to the virtual tour, students can submit their questions for scientists to answer, and teachers can download a trip journal for their students to complete as they follow the tour.
http://www.efieldtrips.org/Invertebrates/index.htm .

Seaside Chats - Texas
Flower Garden Banks National Marine Sanctuaries will host a series of free Seaside Chats, each Wednesday in February. The presentations will take place at the Galveston Fishing Pier, followed by an informal chat time and light refreshments.
http://flowergarden.noaa.gov/newsevents/calendar.html

SeaSketch and TURFs
SeaSketch is an online collaborative mapping tool that enables planners, managers, and community members to contribute information about marine projects. SeaSketch allows all people, regardless of GIS experience, to contribute their ideas and comments into an interactive map platform. A current project is Discover TURFs - an interactive map that will help users visualize the locations of Territorial Use Rights in Fisheries (TURFs).
http://www.discoverturfs.com/home.html

Seasonality Module
Earth-Sun relationships play an important role in governing seasonality and climate patterns on Earth. This lab exercise from NASA and posted in the Encyclopedia of Earth is designed to explore seasonality and climate, including climate change, from the perspective of satellite map interpretation.
http://www.eoearth.org/article/NCSE-NASA_Curriculum_Module_-_Seasonality

Seasons Simulator
This website offers an easily understood seasons and ecliptic simulator.
http://astro.unl.edu/naap/motion1/animations/seasons_ecliptic.swf

SeaTrek
SeaTrek brings multimedia science programming right into the classroom using videoconferencing and Internet technology. These programs feature scientists working in the field with interviews showing how their interests led them to their careers. Each program is supported by a free, downloadable, companion curriculum, aligned with National and Sunshine State Science Education Standards, hosted on the Mote website.
http://www.seatrek.org/

SeaWeb Resources
SeaWeb, working to raise awareness of the growing threats to the ocean and its living resources, is a communications-based, international nonprofit organization that utilizes social marketing techniques to advance ocean conservation. Their resources include marine science citations, ocean issue briefs, public opinion research and analysis, and more. The Marine Science Review offers summaries of new marine science articles, generally focused around a specific theme.
http://www.seaweb.org/resources/msr.php

Seaweek
The Marine Education Society of Australasia runs a national themed Seaweek each year. The website hosts many downloadable materials and other resources. Check out the resources on the decline of sawfish, bycatch, sharks, ocean cultures, and much more. There are lesson plans, puzzles and games, information sheets, and useful links for more information.
http://www.mesa.edu.au/seaweek.asp

SeaWIFS Teacher Resources
The SeaWIFS project uses space technology to study phytoplankton. The website offers the downloadable Living Ocean Teacher's Guide, a guide for grades 9-10 that discusses satellites, ocean color, phytoplankton, the carbon cycle, and greenhouse effect; a tutorial about ocean color using SeaWIFS images; and many other useful resources.
http://oceancolor.gsfc.nasa.gov/SeaWiFS/TEACHERS/

SeaWinds Scatterometer
One of NASA's Earth-observing instruments, the SeaWinds scatterometer, Midori 2, transmits radar data to measure wind speed and direction over Earth's oceans. It provides high resolution and broad geographic coverage of ocean wind speed and direction, sea ice extent and properties of Earth's land surfaces.
http://winds.jpl.nasa.gov

SeaWorld Educational Resources
The SeaWorld website has books, teacher's guides, and videos both for sale through our catalog and free online. The down-loadable teacher guides include Shark, Splash of Math, Whales, and many more. The kids' Fun Zone includes song books, stories and activities. There is also a toll-free number or "Ask Shamu" email that students and teachers can contact with questions about animals.
http://www.seaworld.org/education-programs/index.htm

SeaWorld Resources
SeaWorld provides teachers with information and activities that can motivate students to conserve wildlife, the oceans, and the natural world. Teachers can download Teacher Guides and classroom activities. Information about animals includes Animal InfoBooks for in-depth information about many species and issues, and Animal Bytes for quick information and fun facts about animals. There's also an Animal Sounds Library, and Wild World with information about grass land, tide pool, and tropical forest ecosystems.
http://www.seaworld.org/just-for-teachers/index.htm

SECOORA's Classroom
As part of the Southeast Coastal Ocean Observing Regional Association's education and outreach efforts, SECOORA offers educational resources related to coastal and ocean observing for the Southeast on their website. Check out The Virtual Wave Classroom, Marine Scientist Interviews, and more.
http://secoora.org/classroom

SECORE
The SECORE Foundation is a global network of scientists, public aquarium professionals, and local stakeholders. It uses a multidisciplinary strategy combining research, education, outreach, and active reef restoration for the conservation of coral reefs. The website offers background information about corals along with project information.
http://www.secore.org/site/home.html

SECORE Website
Focusing on sexual reproduction of reefbuilding corals around the world, SECORE (SExual COral REproduction) provides tools for live stock management in public aquaria. They promote cooperation between top scientists in coral reproduction biology and related fields.
http://www.secore.org/

Secret Life of Scientists and Engineers
The Secret Life of Scientists is a web-exclusive series from NOVA which helps the public understand how and why scientists study what they do, as well as what happens when the lab coats come off. Sixteen scientists are currently highlighted on the site, and visitors can visit each scientist's videos and blog posts, as well as ask a question of any of the scientists.
http://www.pbs.org/wgbh/nova/secretlife/

The Secret Lives of Wild Animals
Scientists are developing innovative tracking and information-management technologies to unobtrusively follow the movements of wild animals. Multidisciplinary teams of biologists, computer scientists, and engineers are observing and tracking animals in their natural environment to learn exactly how animals spend their minutes, days and years. The website hosts video downloads of some of the research undertaken to track dragonflies, deals, deer, and others, along with additional information.
http://www.nsf.gov/news/special_reports/animals/index.jsp

Secrets of the Gulf Expedition
Dr. Robert Ballard and a team of scientists will be exploring the Gulf of Mexico in and around the Flower Garden Banks National Marine Sanctuary as part of the Secrets of the Gulf expedition. From March 4-9, 2007, researchers on board the submarine support vessel and at various consoles around the country will be following live video feeds from the Argus ROV, and these will be available on the Oceans Live website.
http://www.oceanslive.org/
http://flowergarden.noaa.gov
http://sanctuaries.noaa.gov/missions/
http://immersionpresents.org
http://flowergarden.noaa.gov/document_library/sci_documents.html

See the New Bridge
The Bridge, with over 1000 teacher-reviewed websites and new, easy-to-use navigation, features an updated look. Ocean science educators will find dynamic resource pages, a more powerful search engine, and mouse-over navigation menu.
http://www.marine-ed.org/bridge

Semester of Service Strategy Guide
The 2010 version of Youth Service America's Semester of Service Strategy Guide was developed to help educators engage young people in an extended service-learning framework of at least 70 hours, and presents step-by-step instructions on how to identify and implement meaningful service and learning experiences.
http://www.ysa.org/2010-sos-guide

Semester of Service Strategy Guide
Youth Service America's (YSA) Semester of Service Strategy Guide provides instructions on planning and implementing semester-long service-learning projects. The guide is designed to complement the many other resources available from YSA, including the Service-Learning Curriculum Guide, Project Planning Toolkit, Classroom Poster, and more.
http://www.semesterofservice.org/

SE-PORT Ocean Awareness Days from SouthEast COSEE
The South East Portal to Ocean Research for Teachers (SE-PORT) is an initiative from the SouthEast Center for Ocean Sciences Education Excellence (SouthEast COSEE). The targeted region includes Georgia, North Carolina and South Carolina. SE-PORTs are partnerships between SouthEast COSEE, an informal education institution (e.g. aquarium, science center), and the teachers who participate in the SouthEast COSEE Ocean Sciences Education Leadership Institutes.
http://www.scseagrant.org/se-cosee/partners.htm .

Service-Learning: Education Beyond the Classroom
The EPA offers *Service-Learning: Education Beyond the Classroom*, describing seven environmental conservation projects that schools and community groups have conducted with elementary school-aged youth. The document includes additional projects for middle and high school youth, as well as a list of partnering national organizations.
http://epicenter.nationalserviceresources.org/index.taf?_function=abstract&Layout_0_uid1=33334

Sesame Street Hurricane Kit
A hurricane comes through Sesame Street and this website offers tips, activities, and videos for young children and their parents.
http://www.sesamestreet.org/parents/topicsandactivities/toolkits/hurricane

Seven Essential Principles for Ocean Literacy
Dolphin Quest supports ocean literacy and offers *Seven Essential Principles for Ocean Literacy: An Activity Guide for Educators*. This activity guide is the first in a three volume series that will help teachers and informal educators for grades K-12th embrace the Ocean Literacy Principles and put them into practice in their curriculum. This initial volume includes an introduction to the importance of the principles in curriculum, and each chapter includes the fundamental concepts of that principle and a summary of how

to put them into use in classrooms, including highlights from the National Science Education Standards scope and sequence matrix. This guide has 28 activity-based lessons, one for each grade group for each of the seven principles. Each lesson has fundamental concepts, National Education Standards, Hawaii Content Performance Standards and Bermuda Science Standards identified for the principle. Future volumes will be produced in 2007 and 2008.
http://dolphinquest.org/learningquest/school/school_programs.php?ID=177471150

Severe Thunderstorms and Tornadoes in the United States
The Congressional Research Service offers this report which outlines possible strategies for mitigation, forecasts and warning improvements, as well as the role of the National Weather Service. The report discusses possible links between severe weather and climate change, as well as what measures to mitigate climate change might reduce future losses from hazards such as tornadoes..
http://www.fas.org/sgp/crs/misc/R40097.pdf

Shamu TV
Shamu TV is an environmental education series from the SeaWorld and Busch Gardens Worlds of Discovery. Each 30-minute episode features stories about animals and the efforts of people working together to save them. Information includes biology, ecology, and more. The website includes downloadable teacher's guides, classroom activities, podcasts, and more.
http://www.shamutv.com/education-resources/shamu-tv/index.htm

The Shape of Life
Public Broadcasting System (PBS) hosts the Shape of Life website, which features activities, explorations, and experiments for K-12 formal and informal educators, students, and families. The website includes a downloadable activity guide, critter cards, and background material. Activities include "Can snails smell?" and how to make a jellyfish or brittle star.
http://www.pbs.org/kcet/shapeoflife/resources/index.html

Shape of Life
Shape of Life, based upon the PBS Series Shape of Life, is a series of free short classroom videos that illustrate the evolution of the animal kingdom. It is designed for students and teachers and is NGSS aligned with a focus on biodiversity, adaptability, body structure, and more. In addition to the videos, the website links to lesson plans and additional resources.
http://www.shapeoflife.org/

Shark Alliance
The Shark Alliance is a global, not-for-profit coalition of non-governmental organizations dedicated to restoring and conserving shark populations by improving shark conservation policies. The website hosts the animated film *Predator Turned Prey*, along with other campaign materials for European Shark Week.
http://www.europeansharkweek.org/

Shark Conservation Blog
Shark Week on the on Discovery Channel has changed over the years, and this year they teamed up with the Ocean Conservancy to get the word out on the plight of sharks. The online blog topics include a look at the weird and wonderful Greenland shark, a

campaign by Sherman's Lagoon cartoonist and shark advocate Jim Toomey, and a review of vital rules that can help save some of the hardest hit shark species in the U.S. from overfishing. Check out the related links to a virtual shark dive and more.
http://discovery.blogs.com/shark_conservation/

Shark Ed at NGOpolis
Shark Ed is a new group on the NGOpolis website whose focus is on education and awareness for shark conservation. It offers an online space for people and organizations working on education and public awareness for shark conservation to share resources, coordinate activities, and more. Check out the links to articles on thresher shark tails, sawfish saws, and more.
http://ngopolis.com/groups/profile/2477/shark-ed

Shark Hangout
Discovery Channel will be hosting an underwater Google Hangout for the 26th anniversary of Shark Week from the National Aquarium in Baltimore, Sunday, August 4, 2013 at 11 p.m. ET. This will be an opportunity for shark experts, fish junkies, and others to engage in a live discussion about sharks and will be integrated into the premiere episode of Discovery's Shark After Dark.
http://mashable.com/2013/07/25/shark-tank-google-hangout/

Shark Tagging Through Project Oceanica
Charleston Bump research conducted in 2003 includes tagging and tracking of oceanic sharks using satellite tags. Tagging results will be transmitted by satellites and posted on the Project Oceanic website. Students e-mailed questions to the shipboard and laboratory researchers and the results are posted on the web. Student activities and other information are also posted.
http://oceanica.cofc.edu/SharkTagging/Home.htm

Shark Week
One World One Ocean (OWOO) is teaming up with Discovery in an effort to use Shark Week as the ultimate teaching moment about why sharks matter. To do this, OWOO will be harnessing the power of social communities and new original content to educate audiences about the positive benefits sharks provide to the planet and humanity and the threats currently facing this keystone species and its habitat. Watch shark week starting August 4, 2013.
http://dsc.discovery.com/tv-shows/shark-week
http://www.oneworldoneocean.com/

Shark Week – North Carolina
The North Carolina Aquariums will celebrate Shark Week, July 26-August 1, 2009, at all three facilities: Roanoke Island, Pine Knoll Shores, and Fort Fisher. Activities throughout the week will reveal the mysterious and misunderstood world of sharks. Contact each site for information about Shark Week activities at their facility.
http://www.ncaquariums.com/

Sharks
Shark Week is coming on August 10, 2014 to the Discovery channel, and you need to be ready with the real facts. Check out Upwell's Sharkinar, Kidzone's Sharks, Shark Guardian's 100 Awesome Shark Facts, and Nauticus' shark resources. And don't forget the lighter side, at Sherman's Lagoon.

http://www.discovery.com/tv-shows/shark-week/#!/
http://us5.campaign-archive2.com/?u=c880da0c24096213459a64f11&id=24d19aaf24
http://www.kidzone.ws/sharks/
http://www.sharkguardian.org/shark-facts-top-100-shark-guardian/
http://www.nauticus.org/education/online-teacher-resources
http://shermanslagoon.com/

Sharks International Keynotes
The Southern Fried Science team have posted the keynote addresses from the 2014 Sharks International conference in Durban, South Africa. Learn about sustainable shark fisheries, why scientists and conservationists need to focus on the less charismatic shark species, and more.
http://www.southernfriedscience.com/?p=17732

Sharks: Taking a Bite Out of the Myth
Check out this featured Bridge DATA Activity - Sharks: Taking a Bite Out of the Myth. Many shark populations worldwide are dwindling at alarming rates. In Sharks: Taking a Bite out of the Myth, students mine data from The National Marine Fisheries Service on commercial landings of sharks.
http://www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive0999.html

Sharkwater
The film *Sharkwater*, to be released in U.S. theaters this September, takes the viewer into shark waters of the world, exposing not only the direct exploitation of sharks, but also the corruption that surrounds this issue. Filmmaker and biologist Rob Stewart is eager to reach out to the public and speak to groups about the plight of sharks and his filming adventures. He will be making a cross-country promotion/publicity tour and is interested in scheduling outreach opportunities. Check out the website for educational materials, and contact Mike Schram for tour information.
Contact Mike Schram at mike@sharkwater.com
http://www.sharkwater.com/index.html

Sharkwater at the International Fishing Hall of Fame
The documentary *Sharkwater* will be shown daily courtesy of the International Game Fish Association starting October 21, 2007, beginning with a special kick-off event. From October 2007 through March, 2008, an interactive and educational exhibition based around shark conservation will be featured in the museum's changing gallery; a shark adaptations lab will be available for students in kindergarten through high school; and a monthly lecture series will feature local and national shark experts.
http://www.igfa.org/sharkwater.asp

Sharks 3D IMAX Film
Sharks 3D is a new IMAX film that was shot on location in Mexico, Colombia, Egypt, South Africa, Mozambique, USA, and French Polynesia. The website has a trailer and a list of theatres showing the film. There are also downloadable educator and companion guides with background material and activities.
http://www.sharks3D.com

Shedd Aquarium Activity Guides
The Shedd Aquarium offers several Activity Guides as downloadable files. The topics include Coral Reefs, Fishes, Oceans, and more.

http://www.sheddaquarium.org/teacher_resources.html

Shedd Educational Adventures
The online, searchable, Shedd Educational Adventures (SEA) contains aquatic science resources for K-12 teachers and students. SEA brings the Philippines to life with fact sheets and multimedia interactives based on the Wild Reef exhibit at the Shedd Aquarium. Materials include lesson plans, interactives, and explorer guides – fact sheets about plants, animals, people, and places. Many materials are also available in Spanish. Check out the education link (top of the page) and follow it for teachers.
http://www.sheddaquarium.org/sea/

Sheltered Sea
The Baum Foundation and Coyote Films offer the public service film, A Sheltered Sea - The Southern Passage, about the Marine Life Protection Act Initiative along the California coast. The film highlights the activities taking place in the south coast region from Point Conception to Mexico. The Southern Passage features the collective benefits and challenges of creating a network of MPAs. The website offers a 3-minute trailer along with the downloadable 25-minute film.
Contact Jen Melcon at jen@thebaumfoundation.org
http://www.thebaumfoundation.org/ashelteredsea.html

Shifting Baselines
The Ocean Conservancy is partnering with other organizations, scientists, and filmmakers to produce Public Service Announcements, slide shows, and other multimedia resources to communicate some of the issues involved in ocean resources declines and the shifting baseline phenomena. All materials may be downloaded from the website. Both English and Spanish versions are available.
http://www.shiftingbaselines.org/index_site.html#

Shifting Baselines
Check out this entry from NPR with pictures of trophy fish, for a good visual of what makes a fisherman happy over time.
http://www.npr.org/blogs/krulwich/2014/02/05/257046530/big-fish-stories-getting-littler

Ship Mates
This website from Bigelow Laboratory for Ocean Sciences introduces the principles and technologies of oceanographic research using seasonal data from the Gulf of Maine. Measurements of ocean temperature, salinity, chlorophyll, plus research cruise logs and scientists' insights, are used in data analysis activities. The investigations cover phytoplankton productivity, seasonal layering and mixing of Gulf water, diversity of marine environments, and more.
http://www.bigelow.org/shipmates/

Ship-2-Shore Education
Join Oceanographic Research Vessel *Algalita* in the Great Pacific Garbage Patch in its 10th year of studying human impacts on marine ecosystems. The website includes daily updates and images from the research vessel; the opportunity to interact with the ship's research team; lessons and activities; and more.
http://ship2shore.blogspot.com/

Ship-2-Shore Education Program
The Ship-2-Shore Education Program links students from around the world with the plastic pollution research being performed at sea aboard research vessels. This program allows students to follow daily updates from the Algalita research crew, as well as to interact directly with the crew by sending questions and comments to the research vessel. Supplementary resources and lesson plans on the topic of plastic pollution are provided for teachers to enhance their student's learning experience.
http://www.algalita.org/ship2shore/index.php

Ships and Ports and the Marine Environment
The Australian Marine Environment Protection Association offers new educational materials for middle school students, *Ships and the Marine Environment* and *Ports and the Marine Environment*. These two education packages are student focused, highly adaptable within current pedagogy, and consist of student research information and activities and teacher notes.
http://www.ausmepa.org.au/other.asp?pageId=13

Shipwreck Montana "Live Dives"
NOAA's Thunder Bay National Marine Sanctuary hosted live webcasts from the shipwreck *Montana* on July 14, 2010. Check out the archived "live dives", lesson plans, and more.
http://thunderbay.noaa.gov/

Shipwreck Trail Photo-Mosaic Mission
The National Marine Sanctuaries posts mission logs from the recent Shipwreck Tail Photo-Mosaic Mission in the Florida Keys National Marine Sanctuary. See how NOAA archaeologists document shipwrecks dating back to 1733. The project is creating photo-mosaics of five shipwrecks that will provide valuable archaeological data, serve as a baseline to gauge the affects of severe weather and human impacts on these historic treasures over time, and provide outreach on the maritime heritage of the Keys.
http://sanctuaries.noaa.gov/missions/2006fknms/

Shipwreck Webcast
Lake Champlain Maritime Museum and partners will host a live webcast of the shipwrecked schooner *Sarah Ellen*, November 5, 2009. This free hour-long broadcast will take participants deep under the cold dark waters of Lake Champlain to the wreck. The program will be archived on the website shortly after the initial broadcast.
http://www.lcmm.org/webcast.html

Shipwrecked
In *Shipwrecked!*, students learn about the causes and results of many different shipwrecks along the west coast of the United States and how these accidents have shaped the maritime activities of today. By plotting shipwrecks on charts, students will be better able to visual the high traffic, and often most dangerous, areas of the coastal U.S.
http://www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive1200.html
http://www.marine-ed.org/bridge

Shorebird Management Listserve
A monitored shorebird management listserve, a cooperative partnership of the U.S. and Canadian Shorebird Conservation Plans and maintained by the U.S. Fish and Wildlife

Service, provides users with: a forum to discuss approaches to managing shorebird habitats and discuss regional-scale projects; information on shorebird management resources; answers to specific questions; and technical advice on monitoring shorebirds.
Brad_Andres@fws.gov

Shorebirds of the Pacific Flyway eField Trip
The U.S. Fish and Wildlife Service offers schools nationwide the opportunity to participate in an eFieldTrip titled, "Shorebirds of the Pacific Flyway: Who Are These Olympic Flyers?" The trip is designed to help students learn about what a shorebird is and how to identify shorebirds of the Pacific Flyway.
http://www.efieldtrips.org/Shorebirds/index.htm .

Shorebird Sister Schools Program
The Shorebird Sister Schools Program is an Internet based environmental education program that connects students, educators, biologists, and birding enthusiasts along migratory flyways. The program includes three key components: K-12 curriculum, email network, and web site. A webcast on April 7, 2003 explored shorebirds, their migration, and the Shorebird Sister Schools Program.
http://sssp.fws.gov

Shorefishes of the Tropical Eastern Pacific
This database offers information about the distributions of shallow-water shore fishes from the Tropical Eastern Pacific biogeographic region. Users can identify and generate publishable maps for more than 1000 tropical eastern Pacific shore fish species. The database is available online and through a free iPhone app.
http://biogeodb.stri.si.edu/sftep/
http://itunes.apple.com/ca/app/fishes-east-pacific.-an-identification/id494644648?mt=8

Shoreline Trash: Studies at Padre Island National Seashore
For advanced students interested in pursuing more exploration of the problem of marine debris, the National Park Service published a comprehensive study: *Shoreline Trash*: *Studies at Padre Island National Seashore, 1989-1998.*
phyllis.dermer@noaa.gov

Shortcuts Comics
Shortcuts comic pages come out in many newspapers across the country each weekend. Each comic features well-researched information delivered in a kid-friendly style. Older issues are available as posters for sale and include topics of interest such as fish, clouds, and more; some include a short teacher guide. The November 7, 2005 issue was about Humpback Whales and was created with assistance from the Hawaiian Island Humpback Whales National Marine Sanctuary. More to come of interest.
http://www.comics.com/shortcuts/

Siemens STEM Academy
The Siemens STEM Academy is designed to foster STEM achievement through collaboration and sharing of best practices. Educators can share their favorite lesson plans, ideas, presentations, and other related resources. Upcoming free webinars on STEM related topics include Getting Started with Project Based Learning, Layers of Learning with Google Earth, and more. Resources can be browsed by grade and subject, and include the Science of Hurricanes, Ecosystems Lesson Plan, and more.
http://www.siemensstemacademy.com/

Silver Jackets Program
The Silver Jackets program provides communities with an opportunity to work with all appropriate state and Federal agencies to develop a comprehensive flood risk management program. The Tool Box offers program guides, tips for emergency managers, and more. Other website features include best practice examples, links to additional information, and more.
http://www.nfrmp.us/state/index.cfm

Simple Steps
The Natural Resources Defense Council offers *SimpleSteps.org, Green Living by NRDC*, designed to help people who are looking for easy, environmentally friendly actions they can take every day to protect their health, their home, and the planet. Visitors can read topic suggestions that may take a minute, morning, or month to implement. They can also post their experiences and additional tips through a blog that acts as an archive of topics and comments.
http://www.simplesteps.org/

Sing About Science
Sing a song of chordates, learn a ditty about 200 meters down. The Sing About Science website offers this musical portal through funds provided by the National Science Foundation. The links include lyrics, MP3 files, and more when available. Some linked websites include teacher guides and other materials.
http://www.singaboutscience.org/

Sing About Science & Math Lesson Plans
The Sing About Science website offers links to lesson plans designed to encourage participation in STEM subjects. The list is easy to scan and identifies whether a click will take you to an article, lesson plan, or other information.
http://singaboutscience.org/wp/lesson-plans/

Six Degrees to the Ocean
An Ocean Conservancy website takes the "six degrees of separation" concept and marries it with the ocean. The theory is that any headline appearing in the news can somehow relate back to the ocean within six steps of connection. The activity illustrates just what a small world we live in and how integral the ocean is to our world.
http://www.oceanconservancy.org/site/News2?page=NewsArticle&id=10981

Skeptical Science
SkepticalScience: Examining Global Warming Skepticism tracks, ranks, outlines, and debunks arguments about the science of global warming.
http://www.skepticalscience.com/

Skyeye Weather Teacher's Corner
Skyeye Weather is a weather consulting, education, and career development firm. Their Teacher's Corner website has helpful weather information links plus information on weather-related topics for teachers and students. It also includes science experiments and weather education background information. For elementary students, Puffy-Q answers basic weather questions.
http://www.skyeyeweather.com/learn.html .

Skylight: eTLC Resource Project
This eTLC Resource Project at the University of British Columbia is designed for faculty members interested in improving their teaching. The resources include materials about teaching large classes, promoting feedback in the classroom, promoting cooperation among students, and more. Additional resources include help with eLearning, lesson plans, and suggestions of test and quiz design.
http://www.skylight.science.ubc.ca/aboutetlc

SlideShare
SlideShare is an online community for sharing presentations, documents, pdfs, videos, and webinars. Check this out.
http://www.slideshare.net/

SLO Take Back Program
The San Luis Obispo County Integrated Waste Management Authority announces the implementation of the *SLO Take Back Program* for household batteries, fluorescent tubes, and compact fluorescent light bulbs. Nearly every retailer throughout San Luis Obispo County who sells household batteries or fluorescent tubes and compact fluorescent bulbs will now take those items back from the public for free. Consumers who want to shop green can now safely and easily recycle these products.
http://www.iwma.com/directory-aj/fluorescent%20tubes%20and%20bulbs.html

Sloan Career Cornerstone Center
For students wanting a wider view of science careers, the Sloan Career Cornerstone Center can help students explore the fields of science, technology, engineering, mathematics, and computing. This site provides many resources, including an interview database of professionals working in these areas. Some of the career profiles include hydrogeologist, micropaleontologist, weather service administrator, environmental engineers and more.
http://www.careercornerstone.org/forstudents.htm

Slow Life
Slow Life shows follows marine animals under high magnification, at a speed that we can enjoy. The time lapse cinematography reveals a world of motion. Be sure to read the blog about what you've viewed. (If the dark print on dark background is too hard to read, go under "View-->Style-->No style" for a black and white version.)
http://notes-from-dreamworlds.blogspot.com.au/2014/03/slow-life.html

Slug Discounts
The Banana Slug Band is offering half off discount for music downloads, using the coupon code slugsrule. CD titles include Only One Ocean, We All Live Downstream, RiverSong, and more. The discount ends June 15, 2014.
http://www.bananaslugstringband.com/

SMAP
The SMAP (Soil Moisture Active Passive) satellite is designed to measure soil moisture every 2-3 days over a three-year period. This will permit changes to be observed, ranging from major storms to repeated measurements of changes over the seasons. Check out classroom activities, the connection between water and carbon cycles, and more. The observations will help improve weather forecasts, drought monitoring, flood prediction, and more.

http://smap.jpl.nasa.gov/

Smart Consumers Education Module
World Wildlife Fund's latest education module in the Windows on the Wild series, for grades 6-9, is *Smart Consumers: An Educator's Guide to Exploring Consumer Issues and the Environment*. This 300-page toolkit includes an educator's guide with background information, hands-on activities, an annotated list of resources, a Community Action Guide, and more. For more information, check out
http://www.worldwildlife.org/windows/education_guides.cfm#3

Smartphone Apps
The University of Florida offers this list of apps that may be useful for ecological fieldwork. Categories include data entry, field guides, citizen science, and more.
http://brunalab.org/apps/

Smartphone to Digital Microscope
Build a digital camera microscope cheaply, if you have a smartphone. This website gives step-by-step instructions on how to build a stand which turns your phone into a microscope. Then, with the addition of a second lens, magnification can be as high as 375x. Students can observe plant cells and more, and even photograph their observations.
http://www.instructables.com/id/10-Smartphone-to-digital-microscope-conversion/

Smiling Sea Magazine
Smiling Sea Magazine covers marine science, coastal activities, sports, careers, events, books, music and more, and has articles for younger readers on marine topics. You can download the current issue from the website or request a free copy.
http://smilingsea.squarespace.com/

Smithsonian Education
Smithsonian Education offers more than 1,200 education resources aligned with standards of learning in every state. Lesson plans emphasize inquiry-based learning using primary sources and museum collections. Check out *Ocean Planet: Interdisciplinary Marine Science Activities*, *Contrasts in Blue: Life on the Caribbean Coral Reef and the Rocky Coast of Maine*, and *Decoding the Past: The Work of Archaeologists*. Students can find games, educational materials, and more through the Students pages, including an on-line satellite photo interpretation activity.
http://www.smithsonianeducation.org/

Smithsonian Education
The Smithsonian Education website offers a portal to the institution's educational resources and programs, including the publication *Smithsonian in Your Classroom*, a journal for elementary and middle school educators; research opportunities and resources for the museum community; and professional development programs for educators at all levels. Be sure to check out Prehistoric Climate Change, Ocean Planet, Tale of a Whale, and much more.
http://smithsonianeducation.org/

Smithsonian Folklife Festival
The Smithsonian Folklife Festival, Washington, DC, June 23-27, and June 30-July 4, 2004. One of the festival themes this year is *Water Ways: The Past, Present, and Future*

of Maritime Communities in the Mid-Atlantic, celebrating the coastal region stretching from Long Island, New York, through New Jersey, Delaware, Maryland, and Virginia to the Outer Banks of North Carolina. Maritime workers and artisans from 15 communities in these states will come together to demonstrate their skills and share their stories. This year's festival will be held June 24–28 and July 1–5, 2010.
http://www.festival.si.edu/
http://www.folklife.si.edu/CFCH/festival2004/Festival2004.htm .

Smithsonian Lesson Plans
Smithsonian lesson plans emphasize inquiry-based learning using primary sources and museum collections. Each plan is print-friendly and provides all the materials needed—photographs, reproductions, handouts, activities, suggested strategies, standards information, and additional online resources. Browse lesson plans by subject area or search by grade levels and keywords. Check out T*ale of a Whale and Why It Can Be Told*, *Tomorrow's Forecast: Oceans and Weather*, and more.
http://www.smithsonianeducation.org/educators/lesson_plans/lesson_plans.html

Smithsonian Ocean Portal
The Ocean Portal, developed by the Smithsonian National Museum of Natural History, is an interactive website that offers an introduction to ocean science, marine life, and a history of the ocean. The website provides lesson plans, activities, and resources for educators; be sure to check out the educator pages. Sign up for the Ocean Portal newsletter to stay current on ocean news and learn about upcoming events.
http://ocean.si.edu/

Smithsonian Photography Initiative
The Smithsonian Photography Initiative is dedicated to promoting the use of Smithsonian photographic resources (roughly 13 million images located in approximately seven hundred collections). This website offers an online repository of images, a gateway to exhibitions, and more. The images are copyright protected, but fair use of copyrighted material includes the use of protected materials for non-commercial educational purposes, such as teaching and scholarship.
http://www.photography.si.edu/

Smithsonian Quests
In this online program, K-16 students earn digital badges by proving their knowledge of environmental topics and completing various activities in their community. For example, to earn an Oral Historian badge, students identify community members who have water-dependent careers and create artifacts for future historians to understand what life is like today. Quests are reviewed by a panel of Smithsonian experts.
http://www.smithsonianconference.org/shout/badges/

Smithsonian Shout Webinars
The Smithsonian Shout Online Conference Series provides exchanges with experts in science, the arts, and more, offering visuals such as artworks, maps and graphics, and video clips. Archived programs can be accessed at any time and include Study with the Land, Sustain the Land, and more.
http://www.smithsonianconference.org/shout/schedule/

Smithsonian Science How?
Smithsonian Science How? delivers real-world science through free, interactive, live webcasts and supporting resources. The 25-minute programs feature the research and personalities of the Smithsonian's National Museum of Natural History, providing students with positive STEM role models, information about science careers and pathways, and connections to current research. All webcasts are archived for use at a convenient time. Resources include a teacher guide, assessment, and more.
https://qrius.si.edu/jump/live-qrius-science-webcasts#.U5Bt-igUrpU

Smithsonian X 3D
The Smithsonian X 3D project was created by the Smithsonian's Digitization Program Office. The viewer offers students the ability to explore some of the Smithsonian's objects with a level of control that has never been possible until now. Visitors can brows models, view how the technology is being used for conservation and education, learn about blue crabs, and much more.
http://3d.si.edu/

Social Coast
The Social Coast from NOAA's Coastal Services Center offers highlights of economic and demographic data, tools, and methods that can be applied to solve diverse issues. The Social Coast selects the relevant demographic and economic data sets available through the Digital Coast, provides examples of how and why to use them, and introduces techniques for engaging stakeholders. Resources include Econ 120, the ENOW Explorer, and more.
http://www.csc.noaa.gov/digitalcoast/socialcoast/

Social Dimension of Ecosystem-Based Adaptation
The purpose of this document from the UNEP Policy Series on Ecosystem Management is to address and raise awareness of the social dimension of ecosystem-based adaptation to climate change.
http://www.unep.org/ecosystemmanagement/Portals/7/Documents/policy_series_12-small_Nov_2013.pdf

Social Media in Education Resources
This collection of blogs, articles, and videos from Edutopia aims to help teachers deploy social media tools in the classroom to engage students in 21st-century learning. Resources include tips for teaching with new media, creating school guidelines, and more.
http://www.edutopia.org/social-media-education-resources

Social Media and Marine Ecosystems and Management
The February issue (MEAM, Vol. 5, No. 4) of the Marine Ecosystems and Management newsletter offers several perspectives on the use of new media tools in ecosystem based management and marine spatial planning. These include documenting illegal fishing activity using smartphones, using web-based training, a cartoon guide on marine spatial planning, online fundraising, and more. Check out the current issue and watch for more in the future.
http://depts.washington.edu/meam/issues.html

Social NMEA
NMEA is charging ahead into social media with a facebook page and a Twitter account. Like them, check them out, join the conversation.
@NatlMarineEd
https://www.facebook.com/NatlMarineEd

Social Vulnerability Census Block Group Data
The Social Vulnerability Index is a new socioeconomic data set; it has been applied to Census 2000 block groups, and offers a look at a community's social vulnerability. The index can highlight differences in capacity for preparedness and response, as well as areas where resources might be used most effectively to reduce vulnerability. It can also be useful as an indicator in determining the level of recovery from disasters.
http://www.csc.noaa.gov/digitalcoast/data/sovi/

Society for the Conservation and Study of Caribbean Birds
The Society for the Conservation and Study of Caribbean Birds hosts this new website with information about projects, a downloadable newsletter, links to topics of regional interest, and the Bird of the Month.
www.scscb.org

Society for Historical Archaeology
This website highlights the study of the material remains of past societies that also left behind some other form of historical evidence. The education pages include downloadable lessons along with others that can be ordered for a nominal charge, including *History Beneath the Sea: Nautical Archaeology in the Classroom*. Additional website features include helpful information on careers in archaeology and a guide to programs in historical and underwater archaeology, and more.
http://www.sha.org/

Socioeconomic Website
The Office of National Marine Sanctuaries offers this new website focusing on socioeconomics. The focus on socioeconomic in the sanctuary system aims to provide the best possible social science to give all stakeholders a voice in the management of sanctuary resources and foster a more cooperative management process. The website offers background on socioeconomics, links to information for the Channel Islands, the Florida Keys, and economic valuation in national marine sanctuaries.
http://sanctuaries.noaa.gov/science/socioeconomic

Socioeconomics and Climate Change in the Great Lakes Region
This interactive map includes a variety of data on more than 225 counties in the Great Lake region and can help public officials, policymakers, and others determine how their corner of the region might fare based on historic climate data.
http://www.graham.umich.edu/glaac/great-lakes-atlas

SocMon
The Global Socioeconomic Monitoring Initiative for Coastal Management (SocMon) has launched a redesigned website. One of the site's major improvements is the new SocMon database, which has access to completed SocMon site reports searchable by location, author, monitoring purpose, and other fields. The website also includes interactive maps depicting work done at specific sites around the world and improved access to data, publications, and images.

http://www.socmon.org/

SocMon Global Report
SocMon is an initiative aimed at helping coastal managers better understand and incorporate the socioeconomic context into coastal management programs. The new SocMon Global Report highlights dependence on coral reefs by local communities in developing countries, provides information on perceived threats to coastal resources, and points to the inability of coastal managers to effectively implement decades-old recommendations as a significant barrier to coral reef protection.
http://www.reefbase.org/socmon/

Soil Moisture and Ocean Salinity Mission
The Soil Moisture and Ocean Salinity mission is part of a series of Earth observation missions that focus on the science and research elements of ESA's Living Planet Programme to improve our understanding of how the Earth system works and how human activity is affecting natural Earth processes. SMOS will make global observations of soil moisture over land and sea-surface salinity over the oceans to improve our understanding of the water cycle. The website hosts videos, animations, and more.
http://www.esa.int/SPECIALS/smos/index.html

Solar Eclipse Webcast
NASA's Sun-Earth Day team is partnering with the San Francisco Exploratorium to produce a live total solar eclipse webcast and broadcast from China, on August 1, 2008. The website hosts webcasts from previous eclipses going back to 1998 in Aruba, a world map of future eclipses, and links to more information.
http://www.exploratorium.edu/eclipse/

Solutions
A new journal, *Solutions*, focuses on solutions to environmental, ecological, and socio-economic problems. It includes peer reviewed papers and will be available online and in printed version. Solutions Online is the primary venue of the journal and offers a forum for discussion about how to solve the mounting environmental, social, and economic problems.
http://www.thesolutionsjournal.com/

Solutions to Avoid Red Tide
The Solutions to Avoid Red Tide (START) webpage offers basic information and videos about red tide, effects of red tide, and research being done regarding red tide.
http://www.start1.com/Default.aspx

Solutions for The Oceans
Solutions is a nonprofit print and online publication dedicated to showcasing ideas for solving the world's integrated ecological, social, and economic problems. *Solutions for The Oceans* is a special issue of the magazine inspired by a meeting at the Smithsonian to get *Beyond the Obituaries* and look for marine solutions. It will be published mid-January.
http://www.thesolutionsjournal.com/

Somewhere Between Yesterday and Just This Side of Tomorrow
This children's coloring/activity book is a story written from the wildlife perspective, with the focus on awareness of polluting our watershed and the damage of Eurasian water

milfoil in waterways. It is geared for K-6 with watershed, watercycle, pollution, and identification activities. Vocabulary, word search, and more are included with the story. The book is self-published; you may ask for a sample or order directly from the author. Contact Sherry Cavanaugh at ewmbook@hotmail.com

Song of the Oceans
Gary Bowman offers the CD, *Song of the Oceans*, a compilation of original songs celebrating the ocean world and the variety of creatures that live there. The project also addresses modern day conservation challenges. Visitors can listen to *The Tidepool Stomp, Plastic Island, Where Whales Sing*, and others, read the lyrics, and more.
http://www.songoftheoceans.com/music.html

Song of the Salish Sea
From Earthwise Media, "Song of the Salish Sea: a Natural History of Northwest Waters" includes a printable teachers' guide and tidal pool curriculum for ages 11-14. The Song of the Salish Sea was produced in partnership with the People For Puget Sound. Additional educational videos from Earthwise Media include *Rainbows in the Sea: a guide to Earth's Coral Reefs*, *Life on the Edge: a guide to Pacific Coastal Habitats*, *World Between the Tides: a guide to Pacific Rocky Shores,* and more.
http://www.earthwisevideos.com/Earthwise-Media-Products.htm

Songs and Stories
Songs and Stories for Kids About Animals and Nature is a blog for teachers and parents from singer/songwriter/storyteller and educator Rosie Emery. The website includes instructive content along with accompanying song and story suggestions, which can provide ideas for lesson plans. Songs and lyrics are posted to her MySpace page.
http://rainbowdolphin-interconnected.blogspot.com/

Sooty Shearwater Tracking
The www.seaturtle.org website posts the results of satellite tracking of the pelagic seabird, the sooty shearwater. The tracks illustrate the trans-Pacific migration of ten (so far) sooty shearwaters from California to the southern hemisphere. The data is updated every even-numbered day as these birds with satellite tags make their way across the Pacific.
http://www.seaturtle.org/tracking/?project_id=46

Sound Health
The Long Island Sound Study 2010 Sound Health report is downloadable from the website, or in hard copy by request. The Sound Health provides information on water quality, the abundance of animal and plant life in the Sound, and trends in land use along the shore. The updated set of environmental indicators that is used to produce the Sound Health report includes more than 60 indicators that track environmental conditions in the sound and management's response to improve its health.
http://longislandsoundstudy.net/2010/12/sound-health-2010/

Sound Health Blog
Sound Health 2012 discusses water quality, coastal and animal populations, climate, habitats, and land use in and around the Long Island Sound. Dr. Jason Krumholz is a marine scientist serving as NOAA liaison to the EPA Long Island Sound Office and he will be selecting questions to answer on his new Sound Health blog.
http://longislandsoundstudy.net/category/media-center/ask-dr-k/

Sound Science
Sound Science is a "state of the science" document encapsulating what is known about the greater Puget Sound ecosystem and, given present trajectories and trends, what may occur in the future. Reflecting the collaborative expertise and perspectives of over 30 authors, nearly 100 reviewers, and hundreds of workshop participants, the document emphasizes the linkages and dynamic interplay between human and natural ecosystems.
http://www.nwfsc.noaa.gov/research/shared/sound_science/index.cfm

Sound Waves
Sound Waves: Coastal and Marine Research News from Across the USGS explores coastal and marine research from the USGS. The newsletter contains sections such as Fieldwork, Research, Outreach, and more.
http://soundwaves.usgs.gov/index.php

Sounds of the Southern Ocean
This expedition to Antarctica with researchers from Oregon State University's Hatfield Marine Science Center will be the first attempt of deep-water ROV survey of hydrothermal vents and ecosystems in Antarctica. The deployment of deep-water autonomous hydrophones will record sounds generated by moving ice sheets, undersea earthquakes and volcanoes, even vocalizations from large baleen whales.

NOAA's Pacific Marine Environmental Laboratory's VENTS Program website offers a variety of materials complementary to the expedition. The Acoustic Monitoring Project of the VENTS program section offers on-line multimedia about sound. Other sections provide graphics and information about seafloor geology, bioacoustics, physical modeling, and much more.
Expedition's website: http://hmscblog.blogspot.com/
Vents Program: http://www.pmel.noaa.gov/vents/index.html

South Alaska Tectonics and Global Change
Follow along with the Consortium for Ocean Leadership's Deep Earth Academy and the Integrated Ocean Drilling Program (IODP) Expedition 341: South Alaska Tectonics and Global Change, May 29-July 29, 2013. Sign-ups are now open (first-come, first-served) for 45-minute live interactive broadcasts from the ship for your class, museum, camp group, professional development group, or special event.
http://joidesresolution.org/node/2742

South Florida Aquatic Environments
The South Florida Aquatic Environments website provides an interactive program to increase public awareness and understanding of three imperiled south Florida ecosystems - the Everglades, Florida Bay, and Florida Keys – including human impacts, conservation issues, and more. In addition, the website has collection-based data from the Florida Museum of Natural History's Ichthyology Collection. Check out the education pages, identification keys, image gallery, and much more.
http://www.flmnh.ufl.edu/fish/southflorida/pisces.html

South Florida Sponge Guide
Researchers at the National Coral Reef Institute along with an international team of experts, offer the South Florida Sponge Guide website. The website offers an

interactive identification guide to the shallow-water marine sponges of South Florida, including illustrated keys and descriptions of organisms, their diagnostic components, habitat, and biological data.
http://www.nova.edu/ncri/sofla_sponge_guide/index.html

Southeast Phytoplankton Monitoring Network
The Southeast Phytoplankton Monitoring Network (SEPMN) is a NOAA-funded harmful algal bloom (HAB) monitoring program based in Charleston, SC. This program is designed to get students and the community involved in science research to help understand HABs and their effects on humans and the environment. Volunteers include elementary, middle, and high school students, colleges and universities, civic groups and environmental organizations, and state and federal research institutions.
http://www.chbr.noaa.gov/CoastalResearch/SEPMN/index.htm

SouthEast Portals to Ocean Research for Teachers
SouthEast Center for Ocean Sciences Education Excellence (SouthEast COSEE), reaches out to the education community with ocean science information in the southeastern region of NC, SC and GA. 12 *SE PORTs* (SouthEast Portals to Ocean Research for Teachers) have been formed in partnerships between SouthEast COSEE, an informal education institution (such as a museum or aquarium), and teachers.
http://www.scseagrant.org/se-cosee

Southwick Associates Reports
Southwick Associates specializes in economic and business statistics related to fish and wildlife. They help natural resource agencies and the outdoor industries understand the retail sales, economic impacts, and other benefits businesses and people receive from wildlife and fisheries. The website offers many downloadable reports and newsletters, including the 2006 Economic Impacts of Hunting and Fishing.
http://www.southwickassociates.com/

Space Weather
The Space Weather Prediction Center is part of the National Weather Service and is one of nine National Centers for Environmental Prediction. The center provides real-time monitoring and forecasting of solar and geophysical events which impact satellites, power grids, communications, navigation, and many other technological systems. Check out the Education and Outreach Resources for links to overviews, videos, and more.
http://www.swpc.noaa.gov/

Spanish Galleon Trail
The Florida Bureau of Archaeological Research, Underwater Archaeology Program offers their latest website addition, the *1733 Spanish Galleon Trail*, which interprets the sites of thirteen 1733 Spanish shipwrecks along the Florida Keys as destinations for heritage, recreational, and ecological tourism. Descriptions presented here of each shipwreck include its environment, water depth, site plan, photos, and more.
http://dhr.dos.state.fl.us/archaeology/underwater/galleontrail/

Spanish issue of *Current: the Journal of Marine Education* focused on Marine Protected Areas
The National Marine Protected Areas Center sponsored the Spanish translation of the July/August 2004 edition of the National Marine Educators Association's quarterly

journal, *Current: the Journal of Marine Education*. The issue focuses on marine protected areas (MPAs) and explores challenges facing MPA managers committed to wise public resource use and conservation, education about our nation's coastal and marine environment, and the public's interest in both enjoying these resources and preserving them for future generations.
http://www.MPA.gov

Spanish Language Marine Science Resources
You can find full course materials, from homework to labs and assessments, in English and Spanish, spearheaded by teacher Mark Friedman and hosted by Pearson Publishers. The Marine Biology course, available online, correlates to NGSS and Common Core standards. Miller and Levine, authors of a biology book with material on marine science and evolution, will also link their materials to the Pearson site of bilingual marine science resources; check out the online book on their website
http://ocas.pearsonschool.com/ph/cd/0-13-166433-6/Resources/index.htm
http://millerandlevine.com/marine/

Spark 101
Spark 101 features free interactive videos made by industry professionals on science, technology, engineering, and mathematics (STEM) topics. Teachers can use these brief videos to engage students in solving real-world problems. The content is directly connected to national curriculum from the College Board's Advanced Placement, the National Academy Foundation, and Project Lead the Way. The videos have a three-segment format, with pauses for student dialogue.
http://www.spark101.org/

Sparticl
Sparticl is a web and mobile service for teens which offers a collection of science, technology, engineering, and math information, images, videos, games, and hands-on activities. Topics include Living Things, Earth & Space, Explore, and more. Explore topics by category or by keywords.
http://www.sparticl.org/

Spatial Thinking in the Geosciences
The Science Education Resource Center at Carleton College provides teaching activities, visualizations, and print and online references for educators who wish to incorporate spatial thinking into their classrooms. There are over 30 activities, including Earthquakes, Calculation of Stream Discharge, and more. Visualizations include seafloor topography, satellite images, and more.
http://serc.carleton.edu/NAGTWorkshops/spatial/index.html

Spatial Trends in Coastal Socioeconomics
The Spatial Trends in Coastal Socioeconomics website provides coastal and ocean managers with one-stop shopping for associated demographic and economic information. The website offers dynamic access to national-scale datasets in those geographic units that coastal and ocean managers must work with daily.
http://marineeconomics.noaa.gov/socioeconomics/

Speak Up for Blue
SpeakUpForBlue.com is a website dedicated to communicating ocean science, exploration, and conservation to build awareness of the oceans and their issues. The

website highlights news, solutions, and interviews with various people and organizations around the world who are using innovative techniques for ocean conservation.
http://www.speakupforblue.com/

Special Days for EE 2015
Check out the updated 2015 Special Days for EE school year planner. Be sure to celebrate Save the Frogs Day (April 25, 2015), Pollution Prevention Week (September 15-21, 2015), and many more. Each links to a bit of information about the time period along with a link to a website for details.
http://eeingeorgia.org/resource/about.aspx?s=16215.0.0.4863

Special Days for EE: 2010 Planner
Environmental Education in Georgia offers this listing of special days set aside for Environmental Education, including National Wildlife Week, American Wetlands Month, and World Ocean Day.
http://eeingeorgia.org/core/item/page.aspx?s=16215.0.0.4863

Special Days
Sylvan Dell Publishing offers a running calendar of some fun-to-celebrate events on their website. In addition to World Wetlands Day, there is a Cephalopod Awareness Day and even a Festival of Sleep Day. Daily themes include links to appropriate books, ideas, and free activities.
http://www.sylvandellpublishing.com/SpecialDays.htm

Special Days for EE: 2012 Planner
This printable calendar identifies special days set aside for environmental education, including Earth Day, American Wetlands Month, and more.
http://eeingeorgia.org/Files/EE/2012/2012_EE_Planner.pdf

Special Days for EE: 2009 Planner
EE in Georgia offers this 2009 planner, identifying special days set aside for Environmental Education.
http://www.eeingeorgia.org/net/content/go.aspx?s=16215.0.68.4863

Special Days for Environmental Education 2005 Planner
Each year there are special days set aside for environmental education. We all know Earth Day is in April, but when is America Recycles Day, Arbor Day, National Wildlife Week, and American Wetlands Month? This web page from EE in Georgia highlights special environmental days.
http://eeingeorgia.org/net/content/item.aspx?s=16215

Special Days
Check out these events to get your students involved in the world around us. The websites have resources, calendars of events, and more.

- ***Earth Science Week***, October 12-18, 2008, whose theme *No Child Left Inside* encourages young people to learn about the geosciences by getting them away from the television, off the computer, and out of doors. Check out the contests.
  http://www.earthsciweek.org/
- ***International Coastal Cleanup***, September 20, 2008, offers aquatic and community cleanups of all types organized at your nearby stream, river, lake,

beach, reef, or other freshwater or coastal habitat. http://www.oceanconservancy.org/site/PageServer?pagename=press_icc

- ***National Estuaries Day***, September 27, 2008, is an annual celebration of the vibrant coastal areas where rivers meet the sea. http://www.estuaries.gov/estuaries101/GetInvolved/Default.aspx?ID=153
- ***Take a Child Outside Week***, September 24-30, 2008, is an international internet-facilitated program that encourages all citizens, particularly children, to participate in outdoor activities. http://www.takeachildoutside.org/
- ***World Water Monitoring Day***, September 18, 2008, is an international education and outreach program that builds public awareness and involvement in protecting water resources around the world by engaging citizens to conduct basic monitoring of their local water bodies. http://www.worldwatermonitoringday.org/

Special Days for EE: School Year Planner

Each year there are special days set aside for environmental education. Check out this downloadable planner to incorporate some of these special EE days into your curriculum.
http://eeingeorgia.org/resource/about.aspx?s=16215.0.0.4863

Special Days in June

- **June: National Oceans Month**
- June: American Rivers Month
- June 2-10: National River Cleanup Week http://www.nationalrivercleanup.org/
- June 5: World Environment Day http://www.unep.org/wed/2007/english/About_WED_2007/index.asp
- 8: World Oceans Day http://www.theoceanproject.org/wod/

Special Days in March and April 2005

- March 1: Great American Cleanup from Keep America Beautiful http://www.kab.org/programs.asp?id=291&rid=68
- March 22: World Water Day http://www.worldwaterday.org/
- March 23: World Meteorological Day http://www.wmo.int/wmd/
- April 10-16: National Environmental Education Week http://www.eeweek.org
- April 11-16: Excellence in Science, Technology, Engineering, and Mathematics Education week http://www.esteme.org/
- April 15-17: National Youth Service Day http://www.ysa.org/nysd/
- April 22: Earth Day http://www.earthday.net/

Special May Days, 2007

- May – American Wetlands month - http://www.epa.gov/owow/wetlands/awm/
- May 11 – Endangered Species Day – http://www.stopextinction.org/endangeredspeciesday
- May 12 – International Migratory Bird Day - http://www.birdday.org/
- May 22 – International Day for Biological Diversity - http://www.biodiv.org/programmes/outreach/awareness/biodiv-day-2007.shtml

Special Report on Ocean Literacy Scope and Sequence

The National Marine Educators Association has published the NMEA Special Report #3 on Ocean Literacy featuring the Ocean Literacy Scope & Sequence, intended to provide guidance to teachers, curriculum developers, educational researchers, and the

committees developing or revising science standards. Based on the Ocean Literacy Essential Principles and Fundamental Concepts, the report was developed by hundreds of scientists and educators. You can download the report, extracts, and more.
http://oceanliteracy.wp.coexploration.org/

Special Sea Grant Collection
The National Sea Grant College Program offers ocean education resources related to its mission. The Bridge's new Sea Grant Collection provides easy access to these resources. Visitors can search this collection by topic area, keyword, or Sea Grant program. Resources can also be found under the Sea Grant focus areas of Hazard Resilient Coastal Communities, Healthy Coastal Ecosystems, Safe Sustainable Seafood Supply, and Sustainable Coastal Development.
http://www2.vims.edu/bridge/seagrant/

Species of the Day
In order to increase awareness of the enormous variety of life and raise the profile of threatened species across the globe, the IUCN Red List of Threatened Species has launched the *Species of the Day*. For each day of 2010 this initiative will highlight a different species being featured on a range of websites and through various other media channels. The 365 species selected will represent the entire range of groups and cover all regions, with daily fact sheets providing information on the threats to their existence.
http://www.iucnredlist.org/species-of-the-day

Species - Electronic Newsletter from IUCN
The World Conservation Union (IUCN) Species Survival Commission electronically publishes two newsletters each year. While *Species* does not focus on marine species and habitat, they are included.
http://www.iucn.org/themes/ssc/species/spec-int.htm

Species List
The Flower Garden Banks National Marine Sanctuary species list lists plants, animals and bacteria by their scientific names, with common names and photos when available. Categories include sponges, bony fish, and more, including birds.
http://flowergarden.noaa.gov/about/specieslist.html

Species Naming Contest Results
Science can sometimes work slowly. After more than two years, the Bonaire Banded Box Jellyfish Species Naming contest has finally resulted in a new name. Meet the science team, follow the process, learn about taxonomy, learn why it took so long to get published, and read the paper in *Zootaxa*.
http://yearofscience2009.org/themes_ocean_water/general/jellyfish.html

Splash of Math
SeaWorld provides teachers with up-to-date information and activities that can motivate students to conserve wildlife, the oceans, and the natural world. The Splash of Math Teacher's Guide for grades 4–8 was developed at SeaWorld with input from the San Diego County Office of Education. The goal is to offer students an active, hands-on tutorial about how mathematical skills relate to real-life situations, specifically marinelife studies and marine zoological park careers.
http://www.seaworld.org/just-for-teachers/guides/pdf/splash-of-math-4-8.pdf?src=2009WODsilverpopWildlifeAugM

SPLASSH
SPLASSH (Student Programs Like Aquatic Science Sampling Headquarters) is a socially driven network that crowdsources the condition of our waterways. It serves as a platform where students, teachers, researchers, and others can post their water projects, connect with other water investigators, and more.
http://splasshdata.meteor.com/

Sponge Guide
The third edition of The Sponge Guide, a web-based, image-intensive key to the sponges of the Caribbean, has over 230 species-morphs represented in the guide, with over 2,100 images. It has been enhanced with composite images of sponge skeletal elements (spicules and collagen fibers),
http://www.spongeguide.org/

Sponge Poop Recycling
A paper published in *Science* describes how sponges are at the base of a highly efficient recycling pathway, the sponge loop. This Dutch TV YouTube video is subtitled in English and explains the transfer of energy and nutrients produced on coral reefs by sponges.
http://www.youtube.com/watch?v=1LZX0z56zp8

Springer Publishing
As a global scientific publisher, delivering quality content through innovative information products and services, Springer offers a variety of options for you to publish your research as open access with free use to everyone, everywhere. The open access choices allow you to easily comply with the open access requirements of institutions, governments, and funders. Visitors can sign up for new book alerts on topics of interest. One book in the Aquatic Sciences is *The Comparative Embryology of Sponges*.
http://www.springer.com/?SGWID=0-102-0-0-0

SPURS Education and Outreach
Salinity Processes in the Upper Ocean Regional Study (SPURS) is researching the essential role of the ocean in the global water cycle through a series of cruises to explore the salinity maximum region in the Atlantic Ocean using oceanographic equipment and technology. Researchers are studying salinity changes that span thousands of miles simultaneously with those happening in one centimeter of water. The education and outreach resources offer teaching materials about ocean salinity.
http://cosee.umaine.edu/coseeos/spurs/why.htm

SPURS Webinars
Salinity Processes in the Upper Ocean Regional Study (SPURS) is researching the essential role of the ocean in the global water cycle through a series of cruises to explore the salinity maximum region in the Atlantic Ocean using oceanographic equipment and technology. The webinar series is archived and includes Changes in Latitude, From Sailing Ships to Satellites: Studying Salinity Through A Sensor Web, and more. Be sure to check out the Education and Outreach Resources.
http://cosee.umaine.edu/coseeos/spurs/webinars.htm

Squids4Kids
Bring a jumbo Humboldt squid into class and engage students of any age in this hands-on activity. Humboldt squid provide an outstanding teaching platform for discussing climate change, ecology, anatomy, physiology, fisheries science, and more. Squids4Kids supplies frozen specimens of Humboldt squid for use in educational activities at any level and the package includes illustrated background material and dissection guides. Check out the program and resources on the website.
http://gilly.stanford.edu/outreach.html

St. Petersburg Coastal and Marine Science Center
The research programs of the St. Petersburg Coastal and Marine Science Center have a primary focus of investigating processes related to coastal and marine environments and societal implications related to natural hazards, resource sustainability, and environmental change. The website offers links to podcasts, publications, data sets, and more. Check out *Corals: A 50-Year Photographic Record of Change*; *SHARQ*; and more.
http://coastal.er.usgs.gov/

Stabilization Wedges Game
The Carbon Mitigation Initiative is a joint project of Princeton University, BP, and Ford Motor Company to find solutions to the greenhouse gas problem. To emphasize the need for early action, they have created the concept of stabilization wedges – 25 billion ton "wedges" that need to be cut out of predicted future carbon emissions in the next 50 years to avoid a doubling of atmospheric carbon dioxide over pre-industrial levels. This idea is the basis for a new game that can be played by students, teachers, scientists, and others. The website includes background information, descriptions of currently available mitigation tools that have the capacity to reduce future emissions, and materials and instructions for carrying out the game.
http://www.princeton.edu/~cmi/resources/stabwedge.htm

Stakeholder Involvement in Ecosystem Based Management
The October edition of the electronic Marine Ecosystems and Management (MEAM) newsletter offers insight into making the most of stakeholder involvement in ecosystem-based management. Check out this issue and previous ones, all downloadable from the website.
http://depts.washington.edu/meam/issues.html

Stakeholder Participation Toolkit for Identification, Designation and Management of Marine Protected Areas
This document offers introductory basics of stakeholder participation, types of governance, MPA planning, participatory tools, and more.
http://www.rac-spa.org/node/1120

Star Thrower Educational Multimedia
This website from Dr. Bill Bushing includes still images of marine life, archived newspaper columns about marine life with full color images, links to a number of scientific publications on kelp forest ecology research, and more. The images of marine life on the site may be used by teachers and students in non-commercial educational materials, reports and on web sites if they include a copyright notice.
http://www.starthrower.org/home.htm

Starfish Species
The Mother Nature Network hosts this webpage with pictures of 19 starfish, along with brief descriptions of each species.
http://www.mnn.com/earth-matters/animals/stories/19-bizarre-and-beautiful-starfish-species

Stars and Fishes – North Carolina
The North Carolina Aquarium at Fort Fisher offers a Stars and Fishes sleepover event, November 16, 2012 at Fort Fisher, North Carolina. Star-gaze, learn to identify constellations, and discuss the nocturnal behavior of local animals on a guided night hike. The event will include live-animal presentations, crafts, and more.
http://www.ncaquariums.com/archives/14408

Starting Point Investigative Case - Malama Keone'o'oi
This Starting Point teaching module from Teaching Entry Level Geoscience highlights a case study of Malama Keone'o'oi. Students will learn techniques for conducting a local environmental assessment in an ecologically sensitive area. Identification of native plants and methodologies for sampling will be taught in the classroom and then reinforced in the field. The module also includes a community awareness and conservation aspect.
http://serc.carleton.edu/introgeo/icbl/examples/Malamakeone.html

Starting Point: Teaching Entry Level Geoscience
Carleton University's Starting Point project hopes to bridge the gap between information about teaching methods and the everyday experiences of geoscience faculty by providing geoscience specific arguments and examples. The website offers examples of Investigative Case Learning, Service Learning, Teaching with Data, and much, much more. Check out Swampeast Missouri, Winter Geohydrology, and more.
http://serc.carleton.edu/introgeo/index.html

State of the Climate in 2013
NOAA and the American Meteorological Society released the 2013 State of the Climate report. The report uses dozens of climate indicators to track patterns, changes, and trends of the global climate system. It also details cases of unusual and extreme regional events, such as Super Typhoon Haiyan. Topics include Ocean salinity, Stratospheric temperature, and more.
http://www.climate.gov/news-features/understanding-climate/state-climate-2013-highlights

State of the Birds 2011
The Cornell Lab of Ornithology and partners launched the 2011 State of the Birds as a report and website, showing distribution of birds on public lands and waters. The data show the importance of public lands for bird conservation and identifies opportunities for public land agencies.
http://stateofthebirds.org/

State of the Coast
NOAA's State of the Coast website is a source for quick facts and more detailed statistics offered through 14 interactive indicator visualizations, presented across four themes: Communities, Economy, Ecology, and Climate. Collectively, this information highlights connections among a healthy coastal ecosystem, a robust U.S. economy, a

safe population, and a sustainable quality of life for coastal residents.
http://stateofthecoast.noaa.gov/

State of Coral Reef Ecosystems
The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2005 establishes a quantitative baseline of the conditions of U.S. shallow coral-reef ecosystems. Each chapter provides the geographic extent of reef ecosystems; current monitoring and management activities; information on water quality, benthic habitats, associated biological communities, and key threats to ecosystem health; and recommendations for future research and management actions.
http://ccma.nos.noaa.gov/ecosystems/coralreef/coral_report_2005

State of Deep Coral Ecosystems
The State of Deep Coral Ecosystems of the United States, a peer-reviewed report prepared by NOAA's Coral Reef Conservation Program, documents the biology, distribution, and types of deep-sea corals on the continental shelves and slopes of the U.S. including its U.S. Caribbean and Pacific territories. The report may be downloaded from the website; it is also available in print or on a CD.
http://www.nmfs.noaa.gov/habitat/dce.html

State of Flux Gallery
NASA's Global Climate Change website offers the State of Flux – Images of Change. This gallery presents images, mostly from space, chronicling changes taking place over time periods ranging from days to centuries. Categories include extreme events, human impact, ice, and more.
http://climate.nasa.gov/sof/

State of the Gulf
This one-hour documentary on the complex ecosystem of the Gulf of Mexico will be shown on Texas PBS television stations in late February. Check the website later in the month for the trailer, air times and dates, and links to YouTube postings.
http://texasthestateofwater.org/

State of the Nation's Ecosystems: Annual Update 2003
The first annual update of the 2002 report *The State of the Nation's Ecosystems: Measuring the Lands, Waters, and Living Resources of the United States* has been released by The Heinz Center. The report was published in 2002,with a 20-page chapter on Coasts and Oceans, as well as chapters on five other types of ecosystems. The 2003 update provides access to data on ecosystem conditions that have become available since the full report was published.
http://www.heinzctr.org/ecosystems/report.html .

State of the Planet
The State of the Planet is a forum for discussion on varying viewpoints, hosted by the Earth Institute of Columbia University. Blog topics include Climate & Energy, Water, Eco Matters, Millennium Villages, and Education News. Categories include natural disasters, economics, earthquakes, and more.
http://blogs.ei.columbia.edu/

State Policies and Programs Related to Marine Managed Areas: Issues and Recommendations for a National System
The Coastal States Organization, in cooperation with the National Marine Protected Areas Center, conducted research and interviews related to state-level marine managed areas (MMAs) and the potential for future federal/state coordination within a national MPA system. This report characterizes existing MMA policies and programs at the state level; presents the potential implications of the proposed national system of MPAs for coastal states; and proposes recommendations toward an effective national MPA system for consideration by both state and federal officials. Please contact John Lopez at john.lopez@noaa.gov for more information. The direct link to this paper is at http://www2.mpa.gov/mpa/mpaservices/virtual_library/publications.lasso .

State of the Salmon
The State of the Salmon is an international consortium that is dedicated to improving understanding of salmon status and trends across the North Pacific and building a knowledge network that can inform salmon conservation and management decisions in the future. The materials on the site include monitoring, data and maps, a glossary, and more. The Data & Maps area features interactive maps that document existing salmon populations and their movements.
http://www.stateofthesalmon.org

State Policies and Programs Related to Marine Managed Areas: Issues and Recommendations for a National System
CSO and the National MPA Center conducted research and interviews related to state level marine managed areas (MMAs) and the potential for future federal/state coordination within a national MPA system. This report characterizes existing MMA policies and programs at the state level; presents the potential implications of the proposed national system of MPAs for coastal states; and proposes recommendations toward national MPA system for consideration by both state and federal officials.
http://www2.mpa.gov/mpa/mpaservices/virtual_library/publications.lasso .

State Resources List
The Environmental Literacy Council is developing state-by-state resource lists of local environmental education centers, parks, museums and natural resource agencies. The site can offer teachers a single place to start planning a field trip, contact experts, and more. The pages are still in development, and your suggestions are welcomed. Send them information about training opportunities, environmental education centers, and good sources of information for your local community.
http://www.enviroliteracy.org/category.php?id=15

State of the Science Fact Sheets
NOAA focuses on research with a high relevance to society. The State of the Science Fact Sheets reviews key research areas which may be of great interest to the public, and where there may be a diversity of science views within NOAA, and posts the most recent documents online. Current postings include Interpreting How Climate Change Affects Extreme Events, Ocean Acidification, Weather Forecast Uncertainty, and more.
http://nrc.noaa.gov/CouncilProducts/ScienceFactSheets.aspx

State Wetland Program Evaluation: Phase I
The Environmental Law Institute has released *State Wetland Program Evaluation: Phase I*, as the first part of a multi-phased study of state wetland programs across a

cross-section of states. This study seeks to analyze seven core areas of state wetland programs, including regulatory programs, water quality standards, monitoring and assessment programs, restoration projects and initiatives, public/private partnerships, education and outreach, and coordination with state and federal agencies.
http://www.elistore.org/reports_detail.asp?ID=11079

State of World Fisheries and Aquaculture
The FAO's State of World Fisheries and Aquaculture is available for download in whole or part. The report highlights the growing role of fish in feeding the world. Chapters include status and trends, balanced harvest, meeting future demands, and much more.
http://www.fao.org/3/a-i3720e/index.html

State of the World's Birds
BirdLife International offers the website and on-line database, State of the world's birds, which outlines why birds and biodiversity are important, examining what we know about the changing state of the world's birds, why birds are declining, and what can be done to improve their status.
http://www.birdlife.org/sowb/

State of the World's Sea Turtles
State of the World's Sea Turtles (SWOT) is a partnership among Conservation International, the IUCN Marine Turtle Specialist Group, Duke University's OBIS-SEAMAP, and other organizations and scientists. The SWOT Team seeks to create a global network of specialists working to conserve sea turtles and their habitats, pooling and synthesizing data, and sharing the information with audiences who can make a difference. The website offers interactive maps, reports, news, and more.
http://seaturtlestatus.org/

STATellite
STATellite, the newsletter of the Science Teachers Association of Texas published in February, June, August and December, can be read or downloaded from the Internet. The current issue offers teaching tips about how to engage your students with smart phones, using social media, and more.
http://www.statweb.org/statellite

StatWeb - A Guide to Basic Statistics for Biologists
StatWeb, designed at the University of Durham, is intended to enable students in the biological sciences to learn the basics of statistics. The examples used are largely from the environmental sciences and have built in multi-choice questions to assess understanding. The authors cover different topics within the disciplines of biology and mathematics and provide links to other useful websites.
http://www.dur.ac.uk/stat.web/

Steal This Picture
StealThisPicture.com is an open source photo archive by Michael L. Baird. You can use any picture for personal or non-commercial purpose, with attribution. Pictures include mostly birds, along with some marine mammals and more. While not yet extensive, check it out; you may find just the picture you're looking for.
http://www.stealthispicture.com/

STEM Blogs
NSTA's The STEM Classroom newsletter for June offers a short selection of blogs about STEM topics.
http://www.magnetmail.net/Actions/email_web_version.cfm?publish=newsletter&user_id=NSTA&message_id=2057575

STEM Career
This website offers resources for students, counselors, educators, and parents of those interested in a career path based on STEM education. Key links include Environmental Science, Geosciences, and more.
http://stemcareer.com/

STEM Newsletter
Teachers' Domain and NOVA are partnering on a monthly STEM Newsletter. Each newsletter will feature a selection of resources specifically tailored for classroom use, highlighting STEM media resources from NOVA and Teachers' Domain.
http://www.pbs.org/wgbh/nova/newsletters.html

STEM Research and Resources
The mission of the Center for Excellence in Science, Mathematics and Engineering Education at Iowa State University is to conduct research that will create change in STEM education in K-12 schools, community colleges, and universities. Check the website for professional development workshops, latest research, and more.
http://www.cesmee.hs.iastate.edu/

STEM Smart Workshop Resources
The National Science Foundation sponsored a series of STEM Smart Workshops showcasing practices and resources supporting effective K–12 STEM education.
http://www.successfulstemeducation.org/resources?term_node_tid_depth=All&term_node_tid_depth_1=All

STEM Supplement to the Washington Post
The Washington Post published a special supplement on STEM Education, and it is available as a free download. Check out Adding STEAM to STEM, A Blossoming Career Field, and more.
http://project.mediaplanet.com/usa/stem_education_3_12387/ads/wp_stem_web.pdf

STEMresources.com
The Tennessee Department of Education and Middle Tennessee State University offer STEMresources.com, where teachers can access standards-based instructional tools, curriculum materials, and Internet materials. Among the many resources available from this website are standards users guides, curriculum frameworks, links to other STEM websites, teacher work samples, and much more.
http://www.stemresources.com/

Stetson Bank Monitoring Activity
The Stetson Bank Monitoring Activity from the Flower Garden Banks National Marine Sanctuary is designed to give students a sense of the real-life science being used to monitor habitats in the sanctuary. By comparing photos from year to year they can evaluate the changes taking place on the reef. The website hosts the downloadable activity and photos.

http://flowergarden.noaa.gov/image_library/stetsonimages.html

Stop Disasters Game
A pilot online game from the U.N.'s International Strategy for Disaster Reduction aims to teach children how to protect cities and villages against natural hazards through disaster risk planning and management. The game includes five natural hazard scenarios (flooding, tsunami, wildfire, hurricane, and earthquake) with different levels of difficulty that require critical decision-making and strategic planning. Players assess risk, build and house the local population, and assign roles.
http://www.stopdisastersgame.org

Stop Faking It! Air, Water, and the Weather
Air, Water, & Weather shares the same goal as the other five titles in his award-winning NSTA Press *Stop Faking It!* series. Its content, style, and tone are designed to help every educator who is intimidated by science but tired of relying on avoidance strategies when teaching—including science teachers, homeschoolers, and parents who want to help with homework. The book includes explanations, drawings, and activities that use easy-to-find materials.
http://store.nsta.org/showItem.asp?product=PB169X6

Storm QuickLook
NOAA's Storm QuickLook provides a synopsis of near real-time oceanographic and meteorological observations at locations affected by a tropical cyclone.
http://co-ops.nos.noaa.gov/quicklook.shtml

Stormstruck
Stormstruck is a free game that lets players ratchet up home preparedness before they loose a storm of their own making. Users have the chance to see just what mitigation efforts worked and what didn't in storms of varying degree. It is available to play online or download as an app for the iPhone or iPad.
http://itunes.apple.com/us/app/stormstruck-tale-two-homes/id497824475?mt=8
http://www.stormstruck.org/

The Story in the Ice: Glaciers and Climate Change
This climate change initiative offers the first set of lesson plans in a middle school curriculum being developed by the Earth Day Network and Extreme Ice Survey to educate, engage, and mobilize students around climate change. The two-day set of lessons are correlated to national learning standards and seek to engage students in interdisciplinary learning experiences.
http://www.earthday.org/climatechange

Storytelling For Social Change
This article from *Forbes Magazine*, The 5 Secrets Of Storytelling For Social Change, offers five basic tips and examples of each, for making sure our points get across.
http://www.forbes.com/sites/skollworldforum/2013/08/01/the-5-secrets-of-storytelling-for-social-change/

Stow It-Don't Throw It
The Stow It-Don't Throw It Project is a youth-driven marine debris prevention and ocean conservation program dedicated to protecting marine environments and their inhabitants while educating others to do the same. The project works to engage youth in combating

the dangers of improperly disposed of monofilament fishing line, educate he public on sustainable fishing practices, and engage young people in marine debris prevention programs.
http://stowitdontthrowitproject.org/

Strange Days on Planet Earth
Strange Days on Planet Earth is a four-part series from PBS. The segments include Invaders, The One Degree Factor, Predators, and Troubled Waters. Materials available from the website include downloadable classroom activities geared for each segment and a glossary; check out the *For Educators* link.
http://www.pbs.org/strangedays/

STRAW Project
A Project of The Bay Institute and partners, The Students and Teachers Restoring A Watershed (STRAW) Project coordinates and sustains a network of teachers, students, restoration specialists, and other community members as they plan and implement watershed studies and restoration projects in Marin and Sonoma counties. STRAW provides teachers and students with the scientific, educational, and technical resources to prepare them for hands-on watershed studies, including restoration projects.
http://www.bay.org/watershed_education.htm

Stream Of Dreams
Stream Of Dreams©™ is a watershed education program which helps connect students and their community through art. The program and student-generated murals help students to understand their connections to water and to make changes to protect streams, rivers, lakes, and ocean.
http://www.streamofdreams.org/

Stream to Sea
The Canadian Fisheries and Oceans' Stream to Sea program envisions students and educators in the Pacific region that are well-informed on aquatic ecosystems, motivated by a stewardship ethic, and contribute to the health and sustainability of their community. The website offers free lesson plans (including *Salmonids in the Classroom*) along with associated background material and student handouts for primary, intermediate, and secondary grades. Other activities and resources are also listed.
http://www-heb.pac.dfo-mpo.gc.ca/community/education/eduintro_e.htm

Student Biological Monitoring Programs
This document, published in 2004, identified and described environmental monitoring programs that involve K-12 students to monitor plant and animal species in the United States. The list is currently being updated and will be posted on the website when complete.
Contact Lynna Kaucheck at lynnakaucheck@yahoo.com
http://www.extension.iastate.edu/naturemapping/Teacher%20Materials/Monitoring_Programs.pdf

Student Experiments at Sea
This interdisciplinary curriculum introduces the scientific process, experimental design, and data analysis. The website offers downloadable units on plate tectonics, hydrothermal vents, ridge visualization, and surveying deep sea organisms.
http://www.ridge2000.org/SEAS/for_teachers/curriculum/index.html

Student Experiments at Sea
Join the Student Experiments At Sea (SEAS) through a virtual cruise to the hydrothermal vents of the East Pacific Rise from April 23 - May 14, 2005. SEAS is a program for middle and high school students interested in learning science by participating alongside deep-sea scientists. Follow along with the cruise through the daily log and learn about science at sea. The website includes a teacher resource guide and much more.
http://www.ridge2000.org/SEAS/

Student Monitoring Project Catalogue
Lynna Kaucheck has compiled a listing of biological monitoring projects that allow students as volunteer monitors. Contact her for a copy of the pdf file.
Contact Lynna Kaucheck at lynnakaucheck@yahoo.com

Student Ocean Art Contest
The Coastal America Student Ocean Art Contest asks students to express through art and an essay, the importance of the ocean as well as their understanding of one or more of the Essential Principals of Ocean Literacy. The 2011-2012 winners will be announced in May; check out the winning entries from last year's contest.
http://www.coastalamerica.gov/index.php?option=com_content&view=article&id=1589&Itemid=215

Student Science
Science News for Kids has been renamed Science News for Students. Topics include Earth & Sky, Life, and more.
https://student.societyforscience.org/sciencenews-students

Student Science Communication Project
The Encyclopedia of Earth's science writing initiative aims to help students develop writing skills through the preparation of articles for publication in the Encyclopedia of Earth. Senior level environmental science students and graduate students at several universities and colleges around the nation are writing and publishing articles for the website. The website offers a subset of student articles, a Teacher's Guide, and more.
http://www.eoearth.org/article/Student_Science_Communication_Project

Student Summit on the Ocean and Coasts
The Coastal America Partnership Student Summit on the Ocean and Coasts, March 9-12, 2013 in Washington, D.C., brings together students from around the U.S., Canada, and Mexico to raise awareness of coastal issues and to promote stewardship of our ocean. Students, accompanied by educators, will present issues tied to their local Coastal America Learning Center and the Ocean Literacy Essential Principles and Fundamental Concepts.
http://coastalamerica.wordpress.com/2013/02/27/2013-student-summit-is-coming/

Student Videos Take on Climate Change
UMass Lowell students and NASA unite! students have created five short films on climate change. Join this free event, May 9, 2011 in Lowell, Massachusetts, to see the featured presentations and take part in an open discussion.
http://www.uml.edu/centers/climate-change/

Student's Guide to Global Climate Change
The EPA offers this website for students in grades 6-8. The website covers the science, impacts to society and ecosystems, and solutions to climate change through videos, interactive graphics, and more. Resources for teachers include Tips for Educators and links to additional websites.
http://www.epa.gov/climatechange/kids/resources/additional.html

Studying Climate Change from Beneath the Ocean
The *R/V Knorr* set sail from the Azores on June 10, 2010, with a crew of researcher scientists and three teachers from Massachusetts. The cruise will take them all the way across the North Atlantic back to the ship's homeport at Woods Hole Oceanographic Institution. Follow along with blogs and more.
http://www.whoi.edu/page.do?pid=45257

Submarine Ring of Fire
NOAA's Ocean Explorer has launched The Submarine Ring of Fire 2006 expedition website. An international team of scientists will explore the submarine volcanoes lying along the Mariana Arc from April 18–May 13, 2006. Located in some of the deepest parts of the Pacific Ring of Fire, explorers aboard the *R/V Melville* will focus on interdisciplinary investigations of hydrothermal and volcanic processes on the submarine volcanoes along the Mariana Arc.
http://oceanexplorer.noaa.gov/explorations/06fire/welcome.html

Submarine Ring of Fire 2014 – Ironman Expedition
NOAA's Office of Ocean Exploration and Research website follows the Submarine Ring of Fire 2014 – Ironman Expedition, November 29-December 21, 2014. The posting includes mission logs, images and video, an education module, lessons, and much more. Scientists on the R/V *Revelle* will explore two seamounts in the region of Marinas Arc in the western Pacific Ocean, both part of the Marianas Trench Marine National Monument.
http://oceanexplorer.noaa.gov/explorations/14fire/welcome.html

Submerge – New York
The New York Hall of Science, Hudson River Park, and partners will host the free Submerge! - NYC's Marine Science Festival, October 5, 2014 in New York City, New York - a day devoted to bringing awareness to New York City's coastal waterways. The festival focuses on ocean science while raising awareness of how people influence our local waterways.
http://www.hudsonriverpark.org/events/submerge-2014

Submerged Cultural Resource Management on the Last Frontier
Nearly one-half of the United States ocean coastline falls within the boundaries of the state of Alaska. Home for thousands of years to indigenous maritime Aleut, Eskimo, and coastal Indian cultures, Alaska and its people, past and present, have inextricable links with the sea. Discover Alaska's submerged heritage with a report from a scientific expedition to collect information on several historic shipwrecks in Southeast Alaska. The website includes background materials, photos, and a video clip.
http://oceanexplorer.noaa.gov/explorations/06alaska/welcome.html

Successful Partnering Helps Stranded Dolphin
Coastal America facilitated a successful joining of two of their partners for the return a stranded rough-tooth dolphin to the wild. The Texas State Aquarium, a Coastal Ecosystem Learning Center (CELC), spent the past year rehabilitating Noah at its SeaLab facility. Through the Texas CELC partnership with Coastal America, an Air Force AC-130j Hercules crew from Keesler AFB, Mississippi flew Noah safely through a thunderstorm to the pod in Panama City, Florida on July 15, 2005.
Contact Marguerite Duffy at Marguerite.Duffy@usda.gov
www.coastalamerica.gov/

Sun-Earth Day
Sun-Earth Day is comprised of a series of programs and events that occur throughout the year culminating with a celebration on or near the Spring Equinox, March 19, 2012. Check out the lesson plans and activities on this website and through its links to others.
http://sunearthday.nasa.gov/2012/getinvolved/ed.php

Sun, Sand and Sea Turtles
The Georgia Sea Turtle Center offers the curriculum guide, *Sun, Sand and Sea Turtles: Inspiring Caribbean Youth through Nonformal Education*. Those interested can preview the basic materials by viewing the Master's project of Alicia Marin on the Duke University website.
http://dukespace.lib.duke.edu/dspace/handle/10161/368

Sun, Sand and Sea Turtles Curriculum Guide
The Georgia Sea Turtle Center offers *Sun, Sand and Sea Turtles: Inspiring Youth through Hands-on Learning*, a curriculum guide that can be used both in the classroom and in non-formal education settings with any age group. The syllabus contains material for 15 hours of activity, which can be presented consecutively or in multiple sessions.
http://www.jekyllislandshop.mybigcommerce.com/sun-sand-and-sea-turtles/

SUNY-ESF Educational Resources
The State University of New York's College of Environmental Science and Forestry offers educational units for middle and high school teachers and students free to educators. Materials include Onondaga Lake Educational Unit, Environmental Analysis of Watersheds, and more.
http://www.esf.edu/outreach/k12/res.htm

Surf It, Save It Festival – North Carolina
The North Carolina Aquarium at Fort Fisher, North Carolina, is hosting the *Surf It, Save It: Aquarium Surf Festival.* The event, June 5-6, 2010 at the aquarium, is designed to encourage environmental stewardship through surfing, as well as educate visitors about the sport's culture and lifestyle.
http://www.ncaquariums.com/surf-it-save-it-aquarium-surf-festival

SURF Talk Book
The Summer Undergraduate Research Fellowship (SURF) at the California Institute of Technology is designed to give undergraduate students an opportunity to conduct research under the guidance of leading scientists and engineers. The SURF Talk Book was developed as an aid to their oral presentation requirement. The downloadable book offers advice on how to create a compelling presentation that will capture the audience's attention.

http://www.murf.caltech.edu/fellows/SURF_talk_book.pdf

Surprising Science Blog
Smithsonian.com expands on *Smithsonian* magazine's coverage of history, science, nature, the arts, travel, world culture, and technology. The Surprising Science Blog posts ideas, news, and discoveries from the world of science.
http://blogs.smithsonianmag.com/science/

Survey and Questionnaire Tutorial
The StatPac group offers a tutorial which teaches how to conduct a survey and design a questionnaire. Learn the latest survey research techniques, what works and what doesn't. The tutorial addresses how to maximize survey response rates and design a questionnaire that gets at the true opinions of your sample.
http://www.statpac.com/surveys/

Survey Results on Public Attitudes about Natural Resources
Responsive Management is a public opinion and attitude survey research firm specializing in natural resource and outdoor recreation issues. The website posts a wide variety of survey results, including studies on how the general population values natural resources and outdoor recreation and their opinions on and attitudes toward an array of natural resource-related issues. Select "Natural Resources & Outdoor Recreation Research" from the left side of the webpage.
http://www.responsivemanagement.com/

Survey of Science and Mathematics Education
The Report of the 2012 National Survey of Science and Mathematics Education was prepared with support from the National Science Foundation. The study provides a snapshot of K–12 science and math education with detailed information on science and math teachers, curriculum and instruction, and instructional resources. Read the highlights or download the full report from this NSTA webpage.
http://science.nsta.org/nstaexpress/nstaexpress_2013_02_25_addendum.htm

Survival
Global wildlife charity Wildscreen, whose flagship initiative is ARKive, offers Survival, a free mobile game to raise awareness among young people about endangered animals. Participants race against the clock to tap, pinch, drag, scroll and swipe their way through a series of mini-games while learning about endangered species.
http://www.arkive.org/apps/survival

Sustainability and Climate Change
Sustainability and Climate Change is an online course for middle school educators. The course focuses on the causes and impacts of climate change and introduced strategies to engage students in solutions. Participants develop approaches to integrating the NGSS with the Common Core standards. The online course offers five multimedia lessons that integrate climate data, modeling, and more.
http://moodle2.creativechange.net/course/view.php?id=3

Sustainability Education Clearinghouse
The Green Education Foundation, along with the U.S. Green Building Council, support the Sustainability Education Clearinghouse, a free online tool that provides K-12

teachers with the opportunity to upload and share lessons focused on sustainability. Posted lessons can be selected by a variety of criteria or key word.
http://www.greeneducationfoundation.org/index.php?option=com_sobi2&sobi2Task=search&Itemid=567

Sustainability Education Resources
Shelburne Farms' Sustainable Schools Project offers resources designed to help schools use sustainability as an integrating context for curriculum, community partnerships, and campus practices. Resources include the *Education for Sustainability Starter Kit,* Healthy Neighborhoods/Healthy Kids Guide, and more.
http://www.sustainableschoolsproject.org/

Sustainability Education Resources from Facing the Future
Facing the Future: People and the Planet is a non-profit organization providing teachers, students, and the public with global issues education and action opportunities to shape our future. Their programs include curriculum development, teacher workshop, service learning opportunities and more.
http://www.facingthefuture.org/About/index.htm

Sustainability Lesson Plans
The Center for a Sustainable Future website includes lessons on land use patterns, ozone and particulates, fossil fuels and global warming, usable water, along with other topics related to designing sustainable communities.
http://csf.concord.org/esf/index.php?module=curriculum&type=unit&func=view&order=theme

Sustainability in New Zealand
Learn about the *Kaitiakitanga* (safeguarding the future) educational and environmental restoration programs; *Tipu Ake*, self-help resources for leadership development, organizational transformation, and sustainability; and Enviroschools in New Zealand.
http://www.kaitiakitanga.net/
http://www.tipuake.org.nz/
http://www.enviroschools.org.nz/

Sustainable Consumption and Production Clearinghouse
The United Nations Environment Programme has launched the Sustainable Consumption and Production Clearinghouse, a knowledge and cooperation hub dedicated to advancing Sustainable Consumption and Production (SCP) worldwide. The clearinghouse offers the opportunity to share and find information on SCP around the world including initiatives, news, events, publications, and more; build networks; identify partners; and strengthen capacities.
http://www.scpclearinghouse.org/

Sustainable Development Resources
The online PelicanWeb's Journal of Sustainable Development aims to be a research digest on integral human development, education for sustainable development, and related global issues. The January 2010 issue is a directory of selected online resources on sustainable development and related issues, and offers a selective compilation of links previously used in the journal, along with other recently gathered links.
http://www.pelicanweb.org/solisustv06n01page1.html

Sustainable Financing
Sustainable financing was a popular topic at the Third International MPA Congress (IMPAC3) last October in Marseille, France. Proceedings from a special workshop on the subject are available for download. In addition, the latest issue of MPA News continues the discussion.
http://depts.washington.edu/mpanews/IMPAC3financing.pdf
http://depts.washington.edu/mpanews/MPA137.htm

Sustainable Marine Aquaculture: Fulfilling the Promise; Managing the Risks
Sustainable Marine Aquaculture: Fulfilling the Promise; Managing the Risks is a report of the Marine Aquaculture Task Force, published in January, 2007. The Marine Aquaculture Task Force consisted of scientists, legal scholars, aquaculturists, and policy experts, whose mission was to examine the status and trends in marine aquaculture and to recommend standards and practices for U.S. marine aquaculture to protect the health of marine ecosystems.
http://www.pewtrusts.org/pdf/Sustainable_Marine_Aquaculture_final_1_07.pdf

Sustainable Seafood Curriculum
Find out how NOAA Fisheries scientists produce the information to inform responsible management of our U.S. fisheries with this new six-lesson module, Science Behind Sustainable U.S. Seafood. The lessons use real data and critically discuss real world issues surrounding how our renewable natural resources are managed. While the module is geared towards high school level, it can be simplified for middle school.
http://www.afsc.noaa.gov/education/activities/sbss_module.htm

Sustainable Seafood – A Journey from Sea to Market
Join NOAA Fisheries Service and The Seattle Times Newspapers In Education on *A Journey from Sea to Market*, an introduction into the process of how seafood gets to market. The Alaska Fisheries Science Center website hosts the teacher's guide for the series and will post the series on the website. Note: The series uses examples from the Pacific Northwest and Alaska. If you are from outside this region and would like analogous examples from your region please contact Rebecca Reuter.
http://www.afsc.noaa.gov/education/Activities/seafood_intro.html
Register to receive the series by emailing nie@seattletimes.com.
Contact Rebecca at rebecca.reuter@noaa.gov

Sustainable Seafood: What's Science Got to Do With It?
This five-part NOAA sponsored series ran in the Seattle Times November 25-29, 2012. It can be downloaded from the website.
http://services.nwsource.com/nie/times/index.asp

Sustainable Sites Initiative
The Sustainable Sites Initiative is an interdisciplinary effort to create voluntary guidelines and performance benchmarks for sustainable land design, construction, and maintenance practices. Similar to the LEED certification process for buildings, the initiative attempts to create a system to guide and develop sustainable landscapes in concert with sustainable and green buildings. A draft of the Sustainable Sites Initiative Guidelines and Performance Benchmarks is downloadable from the website.
http://www.sustainablesites.org/

Sustainable Sushi Guide
Monterey Bay Aquarium's Seafood Watch program has launched a new guide to sustainable sushi. Check it out online or order a copy.
http://www.montereybayaquarium.org/cr/cr_seafoodwatch/sfw_sushi.aspx

Sustainable Tourism
The Rainforest Alliance provides information about sustainable tourism on their website, including the second edition of the *Guide to Best Practices for Sustainable Tourism* and the *Directory of Best Practices, Certification and Codes of Conduct for Sustainable Tourism.* The guide was developed to help community businesses and small and medium-sized entrepreneurs adopt specific actions to use sustainable tourism practices in their operations. Additional links and information are also provided.
http://www.rainforest-alliance.org/programs/tourism/certification/index.html

Sustainable Tourism Best Practices
The International Coral Reef Action Network (ICRAN) facilitated a stakeholder-led process of standards development for scuba diving, snorkeling, boat operations, and beach front activities. The partners developed comprehensive conservation and safety standards for marine recreation activities. The website hosts sustainable tourism guides and other materials, some also available in Spanish and French.
http://www.icran.org/mar-tourism.html

Sustainable Working Waterfront Toolkit
The Sustainable Working Waterfront Toolkit is an online suite of tools designed to help coastal communities develop policies that support business and job growth. The toolkit offers a history of working waterfronts, an evaluation of ocean-related economic activity, case studies, and more.
http://www.wateraccessus.com/toolkit.html

SustainLane
SustainLane is a website designed for state and local government officials to exchange best practices in sustainability and network among peers. Categories include climate change policy, water/wastewater, parks/open space/habitat, and more. The website offers a secure directory of government officials.
http://www.sustainlane.us/home.jsp

Swimming Fishes Game
COSEE-Networked Ocean World (COSEE-NOW) presents Swimming Fishes, a human-sized board game appropriate for ages 10 to adult that demonstrates how changes in water temperature may affect fisheries distribution. Check this one out.
http://coseenow.net/2009/09/ocean-home-swimming-fishes/

Sylvan Dell Books
Sylvan Dell Publishing creates picture books that excite children's imaginations, are artistically spectacular, and have educational value. Every book contains an educational section, with the website offering extensive book previews and teaching activities. *Ocean Seasons* look sat the differences between undersea seasons. Explore a world of blue crabs, terrapin turtles, river otters, dolphins, oysters and periwinkle snails through *A Day in the Salt Marsh*. Additional books cover turtles, the rain forest, octopus, and more.
http://www.sylvandellpublishing.com/

Sylvan Dell Books
Sylvan Dell creates books with math, science, or nature themes brought to life by art. Each book includes a 3-6 page "For Creative Minds" section that includes fun facts, crafts, vocabulary, and games to reinforce the educational value. Each title offers online, supplemental resources including 40-60 page, cross-curricular Teaching Activities, Interactive Quizzes, and Related Websites pages. You can preview each book, download the supplemental materials, and much more. All books are aligned to State Science and Core Language Arts and Math Standards.
http://www.sylvandellpublishing.com/index.php

Tackling Marine Debris in the 21st Century
From the National Research Council comes the book, *Tackling Marine Debris in the 21st Century.* The book identifies ways to reduce waste, improve waste disposal at ports, and strengthen the regulatory framework toward a goal of zero waste discharge into the marine environment. It is available for purchase or download from the website.
http://www.nap.edu/catalog.php?record_id=12486

Tagging of Pacific Predators
Tagging of Pacific Predators is a project that is putting satellite tags on thousands of the Pacific Ocean's top predators. The website features animated maps of migrating species. Additional features include videos; ask-a-researcher; stories about the research, the animals, and the scientists; and more. The site will offer education modules for each species.
http://www.topp.org

Tagging Whales in the Antarctic Seas
From May 4-June 13, 2010, scientists and students will journey to the Antarctic Seas to apply suction cup tags to humpback and minke whales to measure their underwater movements and behaviors, in addition to taking measurements of the distribution, abundance, and behavior of prey and physical features of the water column. Follow along with their web log and photos, and check out the 2009 expedition.
http://www.nicholas.duke.edu/antarctica/2010/

Tampa Bay Teacher's Corner
The Tampa Bay Estuary Program offers downloadable lessons, activities, and stories. Check out Fish Invaders at Gypsy Point, Salt Marsh Teacher's Guide, and the high school curriculum, Tampa Bay: Living Legacy.
http://www.tbep.org/teacher/classroom_lessons.html

Take a Cloud Walk
Take a Cloud Walk, a Take a Walk book by Jane Kirkland, is available as a free pdf download. In this full-color, 30-page book, readers learn the basic names and shapes of clouds, why they move, why they are white, how they affect climate change, the difference between weather and climate, and weather terms and conditions such as hail, lightning, and fog. Before downloading, browse the rest of the No Student Left Indoors website for other materials.
http://www.nostudentleftindoors.com/

Take Pride in America
The Take Pride in America partnership is dedicated to installing a sense of volunteerism and good stewardship in all public land users, promoting volunteerism and other civic-

minded programs through a wide variety of organizations and initiatives. The website includes a volunteer opportunity search engine, upcoming events, information kits, award opportunities, and more.
http://www.takepride.gov/index.cfm

Taking Action on Climate Change
This Government of Canada website has student and teacher resources to learn about the science, impacts, and adaptation to climate change and how you can take action by reducing greenhouse gas emissions. Through maps, graphs, and clear text, users can learn the basics of climate change and the greenhouse gases. The site also includes links to other resources.
http://www.climatechange.gc.ca/english/default.asp

Talking Biodiversity: Getting the Message Across
The Royal Society for the Protection of Birds (RSPB) has recently released a report entitled *Talking Biodiversity: Getting the Message Across*. This publication is part of an RSPB project which has explored different approaches and ideas that could help biodiversity specialists strengthen their communications strategies. Five articles highlight a range of issues, including the historical factors that continue to affect the rights of indigenous peoples, the roles of scientists and journalists, and more.
stella.rumbles@rspb.org.uk

Talking Fire without Getting Burned
The National Interagency Fire Center has posted the recording of Talking Fire without Getting Burned, the webinar presented in February 2010.
http://www.nifc.gov/fire_info/PIO_bb/webinar.html

Tapping America's Potential
Leading business groups have launched a website to promote a math and science education initiative which seeks to make improvements to math and science education a national priority and a key component of U.S. competitiveness. The website provides state-specific information on STEM education, links to key reports, results of public opinion research on competitiveness and innovation, and more.
http://www.tap2015.org

Targeting Outcomes of Programs
Targeting Outcomes of Programs focuses on outcomes in planning, implementing, and evaluating programs. It is based on Bennett's hierarchy, which integrates program evaluation within the program development process. The model uses this framework to target specific outcomes in program development and then to assess the degree to which the outcome targets are reached. This website offers extensive information to help your program planning. It is available in English, Spanish, Russian, and Chinese.
http://citnews.unl.edu/TOP/english/contentsf.html

Tax Relief for Teachers
The tax bill includes provisions that may be of interest to teachers. The bill extends for two years a $250 deduction for elementary and secondary school professionals for expenses incurred for books, supplies, and other equipment used in the classroom
http://www.americantaxrelief.goodarticlesite.com/teachers-and-students-save-your-receipts-for-back-to-school-shopping/

Teach the Earth
Teach the Earth, from the Science Education Resource Center at Carleton College, offers hundreds of teaching activities, visualizations, and other resources for teaching earth science. Categories include biosphere, climate change, energy/material cycles, hydrosphere and cryosphere, ocean systems, and more. Special sections are provided on using data and teaching quantitative skills.
http://serc.carleton.edu/index.html

Teacher Day at NAAEE
Teacher Day is October 18, 2008 at the NAAEE Annual Conference, with teacher-focused breakouts designed specifically for their needs. Teachers are offered resources and the chance to meet with providers, make new contacts, and find information and materials to help students learn about the environment in exciting new ways. There will be dozens of other sessions on how to make teaching more effective using the environment as an integrating context for learning.
http://www.naaee.org/conference

Teacher At Sea Program
Join NOAA's *Teacher at Sea Program*, August 26-September 26, 2003, as they crossed the equator while servicing the TAO/TRITON buoy array in the equatorial Pacific Ocean. This array is critical to our understanding of El Niño and for monitoring the dynamics of our oceans. There are webcasts, videos, and opportunities for teachers on future voyages.
http://www.tas.noaa.gov

Teacher at Sea and in the Air Books
NOAA's Teacher at Sea program gives teachers the opportunity to participate in oceanic and atmospheric research with scientists aboard NOAA ships. A book called *Teacher at Sea*, written by an 8th grade teacher and designed for middle school students, is now available, focusing on research conducted during the 2004 Teacher at Sea cruises. The book includes science and math activities as well as terminology. A second book called *Teacher in the Air* is also available. Free single copies of the books are available. Contact noaa-outreach@noaa.gov

Teacher at Sea Blog
Denis Costello is taking part as a teacher at sea in an ocean acidification cruise and will blog about the expedition. The NSF-sponsored ocean acidification research cruise will take place on the Scripps Institution of Oceanography vessel *R/V Melville*, which will travel between San Diego and Seattle during May and June, 2014. The environmental research program will study the effects of upwelling in the eastern boundary of the Pacific Ocean, examining the result of fluctuating amounts of iron in the water.
http://socalcostello.blogspot.com/

Teacher-at-Sea Children's Books
The first book in the Teacher-at-Sea series focuses on oceanographic and atmospheric research, while the second addresses hurricane research. The final book will address fisheries research. The hard-cover books are written at the middle school science level and include science and math activities, glossaries of terms, and full-color images. Daily logs from the 2007 field season voyage are posted on the website, along with questions for both geospatial and environmental science students.
http://teacheratsea.noaa.gov/

Teacher Booklets
The National Aquarium in Baltimore offers downloadable Teacher Booklets containing pre- and post-visit activities on a variety of subjects for students of all grades. While the booklets are designed to complement aquarium programs, they also work as stand-alone pieces in any classroom. Topics include adaptations (grades 2-4), wetland monitoring (grades 9-12), squid (grades 6-12), and many more.
http://www.aqua.org/teachers/booklets.html

Teacher Loan Forgiveness - The Taxpayer-Teacher Protection Act
Teachers who teach math, science, or special education and who have taught for five years in a Title I school may be eligible for new loan forgiveness limits.
http://www.ed.gov/teachers/how/tools/initiative/updates/2005/0124.html

Teacher Tax Deduction for Classroom Expenses
The recent tax legislation signed into law by President Bush includes an extension of the tax deduction for teachers for the first $250 "out-of-pocket" expenses spent on instructional materials and classroom supplies. Remember to keep receipts for classroom materials purchased so that you can take the deduction come tax time.
http://www.nea.org/lac/edtax/index.html

Teacher to Teacher Initiative
The U.S. Department of Education's Teacher-to-Teacher Initiative is helping teachers strengthen their skills by increasing their opportunities to engage in frequent professional development. It provides convenient access to free professional development activities and keeps teachers informed of new policies and best practices vital to their craft. The initiative offers online digital workshops, an e-learning website, and teacher-to-teacher workshops.
http://www.ed.gov/teachers/how/tools/initiative/index.html

TeacherTube
Hoping to fill a need for a more educationally focused, safe venue for teachers, schools, and home learners, TeacherTube provides an online community for sharing instructional videos. It can provide anytime, anywhere professional development with teachers teaching teachers. In addition, teachers can post videos designed for students to view in order to learn a concept or skill. Check out the Mystery of Earth's Tides, Ocean Life images, and more.
http://www.teachertube.com/

TeacherTube and TeacherVision
TeacherTube is a professionally vetted site that offers educators an online community for sharing instructional teacher videos with others around the world through an interface which resembles that of YouTube. Visitors can search for videos by keyword, review helpful documents, and more. TeacherVision, under Teaching Resources, offers an online library of lesson plans, printable books, and more.
http://www1.teachertube.com/

Teacher Under the Sea
The Aquarius Reef Base Undersea Laboratory will be conducting a special science mission from November 11-20, 2009. The *Teacher Under the Sea Mission* will feature a classroom science teacher embedded in the mission's undersea crew. The broadcasts

events, lesson plans, blogs, and archived media will be available on the website so that teachers may access them at times convenient for their classes. Live webcams are available during all missions.
http://www.uncw.edu/aquarius

Teacher's Aquarium Guide
The Ocean Animal Aquarium: Collection of Intertidal Organisms: Mini-Marine Ecosystem, Teachers' Guide: Lessons and Activities for grades K-6 is a 15-page teachers' guide for using a classroom aquarium. At the end are suggestions for activities and ways to integrate the aquarium into daily classroom activities.
http://neosec.wordpress.com/2009/07/08/teachers-aquarium-guide-grades-k-6/

Teachers Ask the Secretary
The U.S. Department of Education recently launched *Teachers Ask the Secretary*, a new feature of its website (http://www.ed.gov). According to U.S. Education Secretary Margaret Spellings, "This easy-to-use page will help teachers learn answers on a wide range of subjects: teacher quality, professional development, state academic standards, and more. We will share best practices and success stories under the No Child Left Behind Act. And we will listen to your concerns."
http://www.ed.gov/teachersask

Teachers' Corner
The Teachers' Corner website, hosted by the Great Lakes Commission through the Great Lakes Information Network, is a web-based clearinghouse for Great Lakes and fisheries K-12 education resources. All educational materials included on the site have been professionally reviewed, and many provide free lessons correlated to Michigan Science Benchmarks. Other features include a chart to compare materials side-by-side, links to relevant resources and organizations, and a discussion forum.
http://teach.glin.net/teachers

Teachers' Domain Available through netTrekker
Teachers' Domain, from WGBH Educational Foundation offers collections and courses to help teachers enhance their students' learning experiences and their own teaching skills. The collections include classroom-ready multimedia resources for use in lessons or independent study; the professional development courses utilize many of the same resources along with videos of exemplary classroom practice. Thinkronize, developer of the netTrekker suite of safe educational search products, and Teachers' Domain have partnered to provide netTrekker subscribers with access to Teachers' Domain multimedia content for teachers and students.
http://www.teachersdomain.org/
http://www.nettrekker.com/

Teachers' Domain: Earth System, Structure, and Processes
The Teachers' Domain website brings together free media resources from a range of public television programs, including videos, lesson plans, and more. Categories include Natural Resources, Changes in the Earth, and more. Check out Drought and Air Quality, Anatomy of a Tsunami, Diatoms Measure Climate Change, and more.
http://www.teachersdomain.org/browse/?fq_hierarchy=k12.sci.ess.earthsys

Teachers' Domain and PBSLearningMedia Merge
Teachers' Domain will be merging with PBSLearningMedia.org, starting in January. Watch the websites for further information about access to the thousands of resources.
http://www.teachersdomain.org/
http://www.pbslearningmedia.org/

Teachers' Domain Redesign
The Teachers' Domain website has been redesigned and offers new features, resources, and easier navigation. The website features multimedia, lessons and activities, links to professional development, and more. Users can browse by subject, keyword search, view special collections, and much more.
http://www.teachersdomain.org/

Teachers' Domain Resources
Teachers' Domain introduces Open Education Resources. Download, share, or re-mix video segments, interactive activities, and lesson plans. The materials let you shape and adapt content to meet your teaching needs. Resources include biogeochemical cycles, natural resources, ecosystems, ocean characteristics, climate, and much more.
http://www.teachersdomain.org/

Teachers Network
The Teachers Network is an alliance of education professionals dedicated to disseminating best-practices throughout the world of public school education. Visitors can find lesson plans, essays by current teachers on their own experiences, and also search a list of grants available to those working in a number of disciplines, including social studies, language arts, and the sciences. The lesson plans are searchable by subject, grade level, and through key word searches.
http://www.teachnet.org/

Teachers' Place: Monterey Bay Aquarium
The Monterey Bay Aquarium's Teachers' Place website offers Teacher Programs, Field Trips, and Classroom Resources. Classroom Resources include lesson plans and interactive media featuring Rocky Shores, Kelp Forest, and much more. Games & Interactives includes downloadable posters, a virtual dive into Monterey Canyon, and more.
http://www.montereybayaquarium.org/lc/teachers_place/

Teaching Boxes
Teaching boxes are instructional units created by collaboration between teachers, scientists, and designers. Each box helps to bridge the gap between educational resources and how to implement them in the classroom. 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. Titles include *Essentials of Weather, Feeding Frenzy: Seasonal Upwelling*, and more.
http://www.teachingboxes.org/

Teaching Boxes from the Digital Library for Earth System Education
Two Teaching Boxes are available for downloading: *Evidence for Plate Tectonics*, and *Essentials of Weather*, with interrelated learning concepts, digital resources, and cohesive narration that helps bridge the gap between individual resources and

understanding. Additional Teaching Boxes on ocean and earthquake-related topics are currently under development.
http://preview.dlese.org/jsp/teachingboxes/

Teaching Climate
Teaching Climate offers a searchable database of reviewed K-12 climate education resources. The resources have been reviewed by subject experts for scientific accuracy, pedagogical soundness, and usability. Topics include Climate Systems, Measuring & Modeling Climate, Human Responses to Climate, and more.
http://www.climate.gov/teaching

Teaching Earth Science
This section of Geology.com offers links to materials for teachers covering nine thematic areas, including earthquakes, erosion, plate tectonics, weather, and more, along with numerous categories, including world records and hurricanes. Selection of a topic leads to numerous links highlighted by a graphic and brief summary statement of what the visitor will find at the site. Spend some time checking this website out – you may discover useful links.
http://geology.com/teacher/

Teaching Geologic Map Interpretation with Google Earth
The Structural Geology Resources Collection at Carleton College presents an online tutorial, Teaching Geologic Map Interpretation with Google Earth. Resources in this collection include the non-traditional approach for using Google Earth to teach strike, dip, and geologic map interpretation, along with assignments and activities, a geologic map interpretation activity for structural geology using Google Earth, and more.
http://serc.carleton.edu/NAGTWorkshops/structure/teaching_geo_map_interp.html

Teaching the Ocean System: Resources for Educators
This website from Carleton College's On the Cutting Edge program brings together data sets, tools, lesson plans, and interactive visualizations to help teach about oceanography and ocean systems. Links include data sets, Internet resources, visualizations, teaching materials, and more.
http://serc.carleton.edu/NAGTWorkshops/ocean/

Teaching Physical Sciences by Ocean Inquiry
Teaching Physical Sciences by Ocean Inquiry, a COSEE-OS supported course at the University of Maine, focuses on educational approaches to help engage students in learning and offers a collection of hands-on/minds-on activities for teaching physical concepts that are fundamental in oceanography. This supplement to *Oceanography* magazine covers density, pressure, heat and temperature, and more. The website offers links to additional activities and videos showing how to run 15 of the lab exercises.
http://tos.org/hands-on/teaching_phys.html

Teaching the Physics and Math of Oceanography Using Satellite Data
This joint project between the University of Washington and The Northwest School in Seattle enhances the links between the teaching of physics, math, and physical oceanography by utilizing scientific data. The website features several physics curriculum materials, a virtual flight through the Endeavor Ridge, and more.
http://www.ocean.washington.edu/people/staff/prs/edu.html

Teaching the Poetry of Rivers
The Colorado Foundation for Water Education offers online lesson plans for teachers that address the interdisciplinary study of watersheds, and assist students with submissions to the River of Words Poetry Contest. These self-paced lesson plans integrate culture, history, poetry, and watershed science.
http://cfwe.org/row.asp .

Teaching with Historic Places
Teaching with Historic Places offers a series of classroom-ready lesson plan which use historic sites to explore American history, downloadable from the website. Each lesson includes maps, readings, and photographs, all of which are accompanied by questions. At the end, activities pull together the ideas students have just covered and require them to initiate their own research. There are twelve lessons included under maritime history.
http://www.cr.nps.gov/nr/twhp/descrip.htm

Teachers' Domain Multimedia Digital Library
WGBH, through funding from NSF, provides a digital library of multimedia for teaching and studying life sciences, including ecology and ecosystems, evolution, adaptation, genetics, and more. It includes broadcast clips and video modules from programs such as NOVA, A Science Odyssey, and ZOOM; interview segments; out-take footage; and interactive web-based activities, along with contextual information for teachers.
http://www.teachersdomain.org

Teachers' Guide to Videos
MindShift offers this downloadable Teachers' Guide to Videos with tips, video links for different subjects, websites to supplement the lessons, and more.
http://blogs.kqed.org/mindshift/2013/03/teachers-ultimate-guide-to-using-videos/

Teachers' Grab Bag
As the school year starts, don't forget that the National Science Teachers Association's Teachers' Grab Bag is available with free access on the Internet. You can find free and almost free items such as videos, publications, CD-ROMs, lab kits and more.
http://www.nsta.org/resourcesgrabbag

Teaching in the Field
This website from the National Association of Geoscience Teachers helps promote models for effective educational field trips, along with an archive of field guides for future reference.
http://nagt.org/nagt/teaching_resources/field/index.html

Teaching with Great Lakes Data
COSEE Great Lakes hosts Teaching with Great Lakes Data, a website which makes it easy to incorporate real scientific data into the classroom. Choose among Great Lakes data sets, teaching methods and tools, or lessons and activities. The resources may be incorporated into your curriculum and are multidisciplinary. Topics include climate and weather, water quality, and fish habitat. Free registration is required.
http://www.greatlakeslessons.com/

Teaching Green: The Middle Years and The Elementary Years
Teaching Green: The Middle Years, Hands-on Learning in Grades 6-8 and the separate *Teaching Green: The Elementary Years, Hands-on Learning in Grades K-5* contain best

teaching strategies and activities contributed to *Green Teacher* magazine during the past decade, updated and revised for these anthologies. They are designed to serve as a complete "green" teaching resource for those working with school-aged youth, inside or outside of schools.
www.greenteacher.com

Teaching Issues and Experiments in Ecology
Teaching Issues and Experiments in Ecology is a peer-reviewed, web-based collection of ecological educational materials by the Ecological Society of America. The website is divided into three sections: Experiments, Issues, and Teaching. All of the materials include background information on the topic addressed, instructions for students, and notes to faculty. Materials cover mimicry, population ecology, foraging and flocking behavior, and more.
http://tiee.ecoed.net/index.html

Teaching Pseudoscience in the Classroom
In the final episode of season seven of Lab Out Loud, Episode 113, Rodney Schmalz and Scott Lilienfeld discus the use of pseudoscience in the science classroom to help give students the tools needed to differentiate between scientific and pseudo-scientific or paranormal claims.
http://laboutloud.com/2014/05/episode-113-teaching-pseudoscience-in-the-classroom/#play

Teaching Psychology for Sustainability: A Manual of Resources
This site includes an overview with a list of general resources that identify connections between psychology and environmental issues; instructor resources, including lecture and discussion topics, class activities, multimedia resources, and suggested readings for students; a bibliography with links to publisher sites for authored books and tables of contents for edited volumes; and a compendium of syllabi from instructors who currently teach psychology for sustainability.
http://www.teachgreenpsych.com

Teaching Resources on Edutopia
Edutopia hosts links to teaching resources for the Japanese earthquake and tsunami, compiled by blogger and STEM educator, Eric Brunsell. Materials include infographics, resources about earthquakes, tsunamis, and nuclear reactors, and more.
http://www.edutopia.org/blog/teaching-resources-japanese-earthquake-tsunami

Teaching Science
The University of Florida will inaugurate a new online journal for K-12 science teachers in Fall 2011, called *Teaching Science*. The journal will be an open, peer reviewed, free online journal for K-12 teachers devoted to what works in the classroom. All teachers are encouraged to submit an article. Be sure to check the website for new issues.
http://www.cpet.ufl.edu/TeachingScience/

Teaching Time Savers
Teaching Time Savers are articles designed to share easy-to-implement activities for streamlining the day-to-day tasks of faculty members everywhere. This series is edited by Professor Michael E. Orrison of Harvey Mudd College and is hosted on the Mathematical Association of America's website.
http://www.maa.org/features/TeachingTimeSavers.html

Team OCEAN – On-Water Ocean Conservation Education Action Network
The Team OCEAN Program promotes public education, including informative brochures as well as one-on-one interpretation; stewardship, by instilling a sense of personal understanding, ownership, and responsibility for the Sanctuary among the general public; and sanctuary presence on the water, emphasizing the importance of the proper use of our resources, now and for future generations.
http://www.fknms.nos.noaa.gov/edu/ocean.html .

Team WILD
This online science game on the ARKive website encourages students to discover the importance of a career in conservation and science. As they play, students discover a diverse range of field tasks a conservation scientist or ecologist performs. Team WILD is supported by curriculum-linked teaching resources.
http://www.arkive.org/education/team-wild

Technology Integration
This site from Edutopia reviews different technology tools for the classroom, how to integrate them, and more..
http://www.edutopia.org/technology-integration

TED-Ed
TED-Ed's commitment to creating lessons worth sharing is an extension of TED's mission of spreading great ideas. The TED-Ed video library offers curated educational videos, many of which represent collaborations between educators and animators nominated through the TED-Ed platform. The platform also allows users to take any useful educational video, not just TED's, and create a customized lesson around the video.
http://ed.ted.com/

TED-Ed
TED-Ed's mission is to capture and amplify the voices of great educators around the world by pairing extraordinary educators with talented animators to produce a new library of curiosity-igniting videos. The new website will launch in early April 2012 and will feature new TED-Ed Originals as well as some powerful new learning tools. Sign up to receive Ted-Ed News or suggest a teacher or lesson, and the TED team will work with the educators chosen to record and animate those lessons.
http://education.ted.com/
http://www.edutopia.org/blog/film-festival-ted-for-teachers

TED Fellows Program
The TED Fellows Program is an international fellowship bringing entrepreneurs into the TED community. They seek 20 young innovators to be a part of the 2011 TEDGlobal Fellows class.
http://www.ted.com/fellows/apply

TED Radio Hour
Based on talks given by riveting speakers on the TED stage, each show is centered on a common theme, such as the crowd-sourcing innovation, inexplicable connections, and more – and injects soundscapes and conversations that bring these ideas to life.
http://www.npr.org/templates/archives/archive.php?thingId=57

TED Talk Talent Search
From April to June 2012, TED will hold special salons in 14 cities on six continents seeking to uncover new talents, voices, and ideas the world needs to hear. They are looking for the teacher, artist, storyteller, prodigy, and many more outstanding speakers. The event in New York will be held June 7, 2012.
http://conferences.ted.com/TED2013/auditions/index.php

TED Talks
TED (Technology, Entertainment, Design) started out as a conference bringing together people from those three fields. The annual conference now brings together thinkers and doers who are challenged to give the talk of their lives (in 18 minutes). The website offers the best talks and performances, with categories including Technology, Global issues, Science, and more. Check out the newer offerings from Peter Tyack, Brian Skerry, Enric Sala, and many more. Check out the offerings from TED Prize winner Sylvia Earle, Richard Pyle, and more. Select "Show talks related to…" for a quick offerings. You can view them by the latest, funniest, most jaw-dropping, and more.
http://www.ted.com/

Teens for Planet Earth and Leadership Institute
Teens for Planet Earth was created by the Wildlife Conservation Society at the Bronx Zoo to help teens who are fascinated by wildlife, nature, and the environment put their passion into practice. The website includes links to background information, service learning information, and more. Adult leaders are invited to participate in a Leadership Institute training, to explore effective programs providing young people with the skills and support in community conservation-based service-learning projects.
http://teens4planetearth.com/

Teens for Planet Earth
This program, developed by the Wildlife Conservation Society, supports teens and teen leaders/educators as they carry out environmental service-learning projects. The website provides a resource library, news articles, and a Take Action section. There's also a special section for Girls for Planet Earth.
http://www.teensforplanetearth.org/

Teens for Planet Earth Social Networking Site
Teens for Planet Earth has been transformed into a social networking site, and sports a new look and ways to help teens (and adults who work with teens) carry out environmental service-learning projects. Members can connect with other members, share photos and videos of their projects; post upcoming events related to their projects; find resources to help carry out a successful project; receive advice on conducting service-learning projects; and much more.
http://www.teensforplanetearth.org

Teens4Oceans
Teens4Oceans' mission is to empower our next generation to become stewards for their ocean through education, experiential learning, scientific research, and innovative technologies. The programs offer the opportunity to get involved through technology, conservation, and research. Check out the webcams and current projects, join the mailing list, and more. They are featuring the first live webcam viewing of a coral spawning event. Updates will be available on Wild Goose Imaging's blog.

http://teens4oceans.org/
http://www.wildgooseimaging.com/blog/wordpress/

Temperature Blast
Temperature Blast is a Maryland Science Center C3 Citizen Science project designed to introduce participants to methods of studying climate. Participants collect data from select stations in the Baltimore region to compare temperatures and log this data for scientists.
http://www.temperatureblast.org/

Ten Top Tips for Teaching with New Media
Eductopia offers *Ten Top Tips for Teaching with New Media.* It offers succinct and practical advice, covering everything from iChat and Twitter to lesser-known tools like VoiceThread and Wordle. The downloadable document is available for free.
http://www.edutopia.org/ten-top-tips

Tennessee Aquarium WebCam
The Tennessee Aquarium's exhibit, the Secret Reef, offers a virtual dive into an exhibit modeling the Flower Garden Banks through a Secret Reef Cam.
http://www.tnaqua.org/OurAnimals/SecretReefcam.aspx

Tennessee's Watchable Wildlife
Tennessee's Watchable Wildlife website has information on the birds found in Tennessee, and can be easily searched by a bird's habitat, color, use of backyards and feeders, or taxonomic group. Each species has a profile where you can find out about the occurrence of the bird in the state, see pictures, hear songs and calls, and find places to see it. Future watchable wildlife categories will include mammals, amphibians, reptiles, fish, and insects.
http://www.tnwatchablewildlife.org/

TerraCycle
Earn money by recycling. Terracycle buys plastic wraps, candy wrappers, and different plastic containers from groups, schools, and fundraisers, to reuse for their business. They make everything they sell out of trash.
http://www.terracycle.net/

TerraLook
Landsat and other satellite sensors have been collecting images of Earth from space for more than 30 years. For the most part, use of this data has been limited to the scientific and land management communities. TerraLook was developed to broaden the population of satellite image users by providing both ASTER and Landsat data as free, georeferenced, simulated natural-color JPEG images for users that lack prior experience with remote sensing or Geographic Information System (GIS) technology. TerraLook consists of two parts: collections of images, and free optional software. Interested teachers should contact Gary Geller at Gary.N.Geller@jpl.nasa.gov
http://terralook.cr.usgs.gov/index.php
http://asterweb.jpl.nasa.gov/terralook.asp

Texas Aquatic Science
Texas Aquatic Science is a comprehensive aquatic science curriculum, from molecules to ecosystems and headwaters to ocean, for middle school and high school students.

The free curriculum consists of an online student textbook, a teacher guide, specially produced videos, and supplementary materials. Additional information offers career examples, aquatic science short stories, and much more. There are 14 online chapters for the student guide, and 78 corresponding activities in the teacher guide
http://www.tpwd.texas.gov/publications/learning/aquaticscience/index.phtml

Texas Coastal Connection
The Texas Coastal Management Program offers the Texas Coastal Connection website, providing the public with easy access to a wide array of online resources on coastal marine issues. The website highlights hot topics along the Texas coast; assists users in finding answers to questions on coastal issues; and serves as a source for information on the state's rich coastal resources. Check out the extensive links section.
http://www.TexasCoastalConnection.com

Texas Education Agency Best Practices Clearinghouse
The Texas Education Agency has established an online clearinghouse of information related to best practices of high-performing and highly efficient campuses, school districts, and charter schools in instruction, dropout prevention, business/management practices, and public school finance and resource allocation. The goal of the clearinghouse is to provide information about best practices that is specific, actionable, and accessible to schools and interested members of the public.
http://www.tea.state.tx.us/bestprac/

Thank You Ocean
A public awareness and information outreach effort is being launched by the California Resources Agency and NOAA. Empowering Californians to protect the Pacific is the focus of the campaign. The campaign is designed to spur citizen involvement and activity to help protect the ocean's health and resources. The website includes a downloadable public service announcement, links to information and activities about the ocean, ways to make a difference, and more.
http://www.thankyouocean.org/

Thank You Ocean Website Redesign
The *Thank You Ocean* campaign website has been redesigned. The new site discusses four major threats to the ocean, features news reports updated daily, describes actions that people can take to protect the ocean, and more. The site offers dynamic content, contests, videos, and connection to social media.
http://www.thankyouocean.org/

Thank You Ocean Report Podcasts
The California *Thank You Ocean* public awareness campaign has launched a new podcast feature. The podcasts discuss how the public can protect the ocean and highlight issues important in ocean and coastal management. The first podcast focuses on the Thank You Ocean campaign itself, followed by podcasts on marine debris, marine protected areas, and more. A new podcast will be posted approximately every 2 weeks.
http://www.thankyouocean.org/podcast/

The Early Years
Science and Children and the National Science Teachers Association have established a blog devoted to early childhood science. You can find teaching advice, management tips, favorite resources, and activity ideas specifically for teachers of grades pre-K–2.

The blog accompanies Science and Children's column *The Early Years*. To view the first column with teacher's picks about marine and environmental science resources, visit http://www.nsta.org/main/news/stories/science_and_children.php?category_ID=86&news_story_ID=50933.
http://science.nsta.org/earlyyearsblog

Thinkfinity Literacy Network
The Verizon Foundation's Thinkfinity Literacy Network links to free, online educational resources for literacy instruction and lifelong learning for adults along with family literacy programs. The content aims to strengthen literacy development, creativity, and critical thinking skills. The website of literacy resources is meant for teachers, volunteers, adult learners, tutors, parents, and students. A simple search on the "marine" brought a response with more than 900 listings.
http://literacynetwork.verizon.org/tln/

Third National Climate Assessment
The Third National Climate Assessment describes the impacts of climate change across ten geographic regions of the United States, and in economic sectors such as agriculture, energy, and health. The descriptions translate scientific insights into practical information. Climate.gov offers a page with links to materials for teaching about climate using the National Climate Assessment. NSTA also offers a variety of climate science-related resources, with free NSTA Science Objects and other materials.
http://nca2014.globalchange.gov/
http://www.climate.gov/teaching/2014-national-climate-assessment-resources-educators
http://www.nsta.org/climate/

This American Land Lesson Plans
This American Land, a public television conservation newsmagazine series, features stories on America's landscapes, waters, and wildlife about conservation, science, and outdoor adventure. Several lesson plans have been developed corresponding to video clips from the program, highlighting conservation efforts. Full episodes can also be viewed, along with field notes and more.
http://www.thisamericanland.org/Educators/lesson-plan-resources

This Land Is Your Land Curriculum
This free, activity-based youth curriculum was developed by Michigan State University Extension. Though developed for grades 3-5, the lessons are easily adaptable to any grade level. *This Land Is Your Land* is a set of land use curriculum materials designed to help students develop into involved citizens who understand the importance and practice of wise land use. It is designed so young people can contribute solutions to current land use issues and participate in making sound decisions now and in the future.
http://web4.msue.msu.edu/msuewc/kent/yourland/

This Week at Hilton Pond – Seagulls
While the focus for this research center is the South Carolina Piedmont, the latest posting on seagulls underscores the fact that you cannot separate "marine" from the greater environment.
http://www.hiltonpond.org/ThisWeek040115.html .

Thoreau's Legacy: American Stories about Global Warming
Penguin Classics and the Union of Concerned Scientists offered established writers and fresh voices the opportunity to contribute their personal stories in this new anthology, *Thoreau's Legacy: American Stories about Global Warming*. The essays selected represent a variety of perspectives, voices, and experiences. The chapters are organized by theme, including Water and Ice, Tales from Urban America, and more. The book may be purchased, or read online.
http://www.ucsusa.org/americanstories/vbook.html

Thresholds in Education Journal Call for Manuscripts
The Thresholds in Education journal invites manuscripts related to topics addressing school-based programs that get students outside and engaged in educational or recreational activities as part of the planned curriculum. The theme of an upcoming issue is *No Child Left Inside: School-based Responses to Nature-Deficit Disorder*. The overall objective of the issue is to showcase the broad-based application of theory and/or practice in K-12 private and public educational settings.
http://www.cedu.niu.edu/lepf/foundations/thresholds/index.html

Thunder Bay Sinkholes Expedition
NOAA Ocean Exploration and Research Program launched information about the Thunder Bay Sinkholes 2008 Expedition, September 2–12, 2008. Scientist explored shallow and deep coastal sinkholes to more fully understand chemical and physical properties that contribute to the unique ecology found in these recently-discovered ecosystems in Earth's largest group of freshwater lakes - the Laurentian Great Lakes of the United States and Canada. Check out the web logs, video, and much more.
http://oceanexplorer.noaa.gov/explorations/08thunderbay/welcome.html

Tidal Creek Habitats
This booklet is based on a synthesis of more than 15 years of research in tidal creek systems. The contents include brief reviews of valuing and studying tidal creeks, recommendations for decision-makers, and links to additional resources.
http://hml.noaa.gov/pdf/tidal_creek_booklet.pdf

Tidal Wetlands Primer
The new book, *Tidal Wetlands Primer: An Introduction to their Ecology, Natural History, Status and Conservation*, is designed for high school and college teachers as well as for park naturalists and others interested in learning more about tidal wetlands. Chapters include their classification, formation, plant response, and more. The Amazon website offers the opportunity to "Look Inside!" to preview the book prior to purchase.
http://www.amazon.com/Tidal-Wetlands-Primer-Introduction-Conservation/dp/1625340222/ref=sr_1_1?ie=UTF8&qid=1388616883&sr=8-1&keywords=tidal+wetlands+primer

Tidepool Math
From the Minerals Management Service (MMS) and the Multi-Agency Rocky Intertidal Network (MARINe) comes Tidepool Math, curricula for K-8 and high school. Students use a plot of a mussel bed to better understand sampling, estimating, and the scientific method. The website has downloadable curricula, photographs to use for the sampling exercises, and flash cards of typical tidepool organisms, or order the CD. Check out the MMS Kids' Pages for other information on Ocean Energy, Sand, and more.
http://www.mms.gov/mmskids/ .

Tides of Change
NASA offers Tides of Change, a series of videos focusing on the ocean-climate connection. Each video features a specific component of the connection, such as marine life or the water cycle. Each can be watched online or downloaded from the website. The videos are captioned for the hearing impaired.
http://www.nasa.gov/topics/earth/features/esw09_videos.html
http://climate.nasa.gov/esw/videoseries/

Tides and Currents
NOAA Ocean Service Education's Tides and Currents is a resource for teachers to explain the physics and application of tides and currents knowledge to real-world situations, and the impacts of tides and currents on climate, environment, and society. Developed with NSTA and other partners, the module has links for teacher and students, along with lesson plans integrating real-time tides and currents data, the effects of tides and currents on oil spills, and how climate change is related to tides and currents.
http://oceanservice.noaa.gov/education/pd/tidescurrents/

Tides & Currents
The Center for Operational Oceanographic Products and Services (CO-OPS) and its predecessors have gathered oceanographic data along our nation's coasts for over 200 years to protect life, property, and the environment. It offers tides, water levels, currents, and other oceanographic information. Educators can easily access the products for data analysis. Check out the education materials, including definitions and background information, links to lesson plans, and more.
http://tidesandcurrents.noaa.gov/education.html

Tides and Currents Web Data Portal
The Center for Operational Oceanographic Products and Services (CO-OPS) offers an Integrated Ocean Observing System (IOOS) oriented web portal to provide access to the National Data Buoy Center's and CO-OPS' observational oceanographic data. Users will find improved methods for observational data retrieval, useful IOOS links, and related information. Navigation is clearly marked with links to products, programs, education, and more.
http://tidesandcurrents.noaa.gov/opendap.html

Tijuana Estuary High School Teacher's Guide
The Tijuana Estuary High School Teachers' Guide is a field-based, inter-disciplinary high school curriculum designed to educate students about the valuable Tijuana River Estuary natural and cultural resources. Chapters include ecology, geology, history, language arts, and more. It has been developed to align to California State Content Standards.
http://www.tijuanaestuary.com/education.asp

Timelapse PlantCam
This outdoor camera takes time lapse photos that can be stitched together to create a video of your project site. It can be used for wetland restoration monitoring, as a teaching tool, and more. The Swamp School website offers two examples of wetland monitoring with the camera.
http://swampschool.org/new/outdoor-nature-cameras/wetland-plantcam/

Timeless Totems: The Carved History of the Alaskan Coast eField Trip
Why did people carve totem poles? How were the totem poles made? What do the designs on the totem poles mean? Take your students on an electronic field trip to Sitka National Historical Park in Alaska to find the answers to these questions. Premiering March 27, 2006, the eFieldTrip has three major components, a virtual visit, a trip journal, and *Ask the Experts*, which also was available February 6-8, 2007.
www.eFieldTrips.org

TIMSS Video
The Third International Mathematics and Science Study (TIMSS) 1999 Video Study was a study of eighth-grade mathematics and science teaching in seven countries. This website from UCLA and the Carnegie Foundation for the Advancement of Teaching make available to the public the 53 public use video lessons along with full English-translation subtitles for each lesson, a searchable transcript, and a set of resources collected with each lesson such as scanned text materials and teacher commentaries.
http://timssvideo.com/

Tips for Successful MPAs
Graeme Kelleher, the first Chairman and CEO of the Great Barrier Reef Marine Park Authority, offers tips for successful MPA management from the keynote address at the WildAid Global MPA Enforcement Conference. Click on the pdf, *Your MPA – Will it Succeed.*
http://listserv.gcfi.org/scripts/wa-GCFI.exe?A2=ind1211&L=CAMPAM-L&P=R114943

Titanic – 100 Years Later
This website from NOAA offers links to a number of Titanic articles and resources, including slide shows, lesson plans, and career information.
http://www.noaa.gov/titanic/welcome.html

To the Everglades
The Everglades Eco Tour is a collaboration between the U.S. Army Corps of Engineers and Everglades National Park. Student from Paxon Middle School in Jacksonville Florida took the field trip and wrote and performed in this music video about Everglades restoration.
http://www.evergladesplan.org/get_involved/ecotour_2010.aspx

To Fight or Not to Fight?
In this conflict resolution activity from Facing the Future, students examine a variety of international and intra-national conflicts through a role-playing activity. They learn to identify the roots of conflict, how to separate positions from interests in a conflict, and experience mediating a conflict. Free registration is required.
http://www.facingthefuture.org/Members/documents/35.To.Fight.Or.Not.pdf

Today's Green Minute
Today's Green Minute is a web-based video series which covers green innovation in science, wildlife, conservation, commerce, global warming, gizmos, and more.
http://todaysgreenminute.com/

TogetherGreen
TogetherGreen is a National Audubon Society program with support from Toyota, to build conservation leadership, engage people in conservation action, and achieve lasting

conservation results. The program offers grants, featured projects, volunteer opportunities, and more.
http://www.togethergreen.org/

Tom Volk's Fungi
This website offers several years of "fungus of the month" entries, along with background information about fungi and related organisms. Check out the Holiday Fungi, special topics, and more.
http://tomvolkfungi.net/

Toolkit for Working with Rural Volunteers
The Toolkit for Working with Rural Volunteers shares approaches to volunteer recruitment, management, and retention that are successful in rural settings--places that don't have a Volunteer Coordinator or even a full-time Director. It also contains tools needed by rural organizations to build sustainable volunteer management infrastructure. The document can be downloaded from the website, or a printed copy can be ordered.
http://www.ruralvolunteer.org/

Tools for Coastal Climate Adaptation Planning
The Tools for Coastal Climate Adaptation Planning provides information for coastal natural resource managers and community planners to select appropriate tools for their projects. The guide focuses on spatially explicit solutions for climate-related planning and describes the utility and role of tools in relevant planning processes.
https://connect.natureserve.org/toolkit/ebm-tool-network/climate-adaptation-planning-tools

Tools of Change
Community-based social marketing can be effective for promoting behavior change for social, personal, and environmental benefits. The approach emphasizes the reduction of barriers to taking the desired actions, direct contact among community members, the use of proven tools of change, and continuous program improvement. This website offers specific tools, case studies, and a planning guide for helping people take actions and adopt habits that promote health and/or are more environmentally-friendly.
http://www.toolsofchange.com/

Tools for Engagement
This planning guide features ideas and resources about how to best engage people in conservation efforts. The downloadable toolkit is divided into sections including core planning steps, resources, and more.
http://web4.audubon.org/educate/toolkit/toolkit.php

Tools for Monitoring Coastal Habitats
This second volume of the two-volume restoration monitoring manual titled *Science-Based Restoration Monitoring of Coastal Habitats* is now available online, courtesy of scientists from NOAA's National Centers for Coastal Ocean Science. Volume Two provides tools and information for the development and implementation of restoration monitoring plans for 13 types of coastal habitats. The information provided is designed more for practitioners who may not have extensive experience in coastal ecology.
http://coastalscience.noaa.gov/ecosystems/estuaries/restoration_monitoring.html

Top 40 National Marine Sanctuaries Accomplishments
The National Marine Sanctuary System marks its 40th anniversary with events and festivities. Starting August 27, 2012, they will highlight an array of historic and contemporary achievements since their establishment in 1972. Each posting will include complementary stories along with additional links and information. Check it out each day.
http://sanctuaries.noaa.gov/news/top40/welcome.html

Top 100 Sites for Going Green
The websites featured here offer stories, advice, and resources about sustainable living.
http://www.environmentalsciencedegree.com/green-living/

Top Ten Tips for Assessing Project-Based Learning
Project-based learning helps students build skills such as collaboration, critical thinking, and global awareness. Educators need to assess the learning that occurs. Edutopia offers the downloadable classroom guide, *Top Ten Tips for Assessing Project-Based Learning.* Tips include Keep It Real with Authentic Products, Gather Feedback – Fast, and more.
http://www.edutopia.org/10-tips-assessment-project-based-learning-resource-guide

Topics in Archeology - Online
The National Park Service's Archeology Program has posted webcasts from an on-going webinar lecture series devoted to dissemination of information about current research in archeology. Currently posted are archeological investigations of World War II Japanese internment camps and the Pleistocene Human Colonization of Interior North America. Topics include locational technologies (LiDAR, satellite imagery, underwater locational technologies and more), research being carried out in parks, and climate change and archeology.
http://www.nps.gov/training/NPSArcheology/html/index.cfm
http://www.nps.gov/archeology/tools/webinars.htm

Topographic and Bathymetric Data Inventory
The first comprehensive inventory of elevation data sets for the nation is now available on NOAA's Coastal Services Center's website. NOAA and FEMA worked together to inventory elevation data, both topographic and bathymetric, for all 50 states and Puerto Rico. Current information focuses primarily on large data sets available for an area.
http://www.csc.noaa.gov/topobathy/#

Topographic Map of Earth
NASA and Japan released a new digital topographic map of Earth. The map was produced with detailed measurements from NASA's Terra spacecraft.
http://www.nasa.gov/topics/earth/features/20090629.html

Tortugas Ecological Reserve Cruise
Scientists from NOAA's National Centers for Coastal Ocean Science conducted their eighth research cruise at the Tortugas Ecological Reserve to determine the ecological and economic consequences of establishing marine protected areas. Scientists aboard the NOAA Ship *Nancy Foster* conducted diver and remote sonar surveys of benthic habitat and fishes from July 25-August 5, 2008. Online mission logs, crewmember information, and background information are posted on this website.
http://www.ccfhr.noaa.gov/ecosystems/sanctuaries/tortugas2008/welcome.html

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http://www.ccfhr.noaa.gov/ecosystems/sanctuaries/tortugas2008/welcome.html

Touch the Invisible Sky
Touch the Invisible Sky is a 60-page book with color images of nebulae, stars, galaxies and some of the telescopes that captured the original pictures. Each image is embossed with lines, bumps, and other textures. These raised patterns translate colors, shapes, and other intricate details of the cosmic objects, allowing visually impaired people to experience them. Braille and large-print descriptions accompany each of the book's 28 photographs.
http://hubblesite.org/newscenter/archive/releases/2008/05/full/

Tour of the Cryosphere 2009
Take a tour of some the coldest places on the planet courtesy NASA's fleet of Earth-observing spacecraft. The text of the video is also available.
http://www.nasa.gov/multimedia/podcasting/TourOfCryosphere09.html
http://www.nowpublic.com/environment/nasa-tour-cryosphere-2009

Tour de Turtles
Tour de Turtles is a fun, educational journey through the science, research, and geography of sea turtle migration using satellite telemetry. Created by the Caribbean Conservation Corporation with help from sponsors and partners, this event follows the migration of sea turtles, representing different species, from their nesting beaches to their foraging grounds.
http://www.tourdeturtles.org/

Tourism Facility Design
UNEP offers the downloadable manual, Environmentally Sound Tourism Facility Design and Development for the Tourism Industry to assist in the training of environmentalists and development planners and to fill gaps in knowledge related to environmental aspects of tourism activities.
http://cep.unep.org/publications-and-resources/promotional-material/publications/spaw/env-sound-tourism-facility-design-and-development.pdf

Tox Town
Tox Town helps students and teachers learn about environmental health concerns and toxic chemicals, by way of an interactive imaginary town, and includes a port scene with algal blooms, beach impacts, and more. The website links include text versions and some Spanish-language resources.
http://toxtown.nlm.nih.gov/

Track Sea Turtles On-Line
SEATURTLE.ORG provides sea turtle researchers with a tool for collecting, managing and sharing sea turtle satellite tracking data in near real-time. There is a list of tracking

projects, links to background information about each program and the turtles they are tracking, and maps that are updated daily. A section for teachers is under development.
http://www.seaturtle.org/tracking/

Tracking Bluefin Tuna
Check out this website to track Bluefin Tuna in the Atlantic Ocean using Google Earth. An online tour shows what they're tracking, why they're tracking it, and the results of what they've discovered so far.
http://www.gearthblog.com/blog/archives/2011/10/tracking_bluefin_tuna_across_the_at.html

Tracking Cranes Classroom Program
As a global family of birds, cranes offer an opportunity for teachers to combine the study of cranes with learning about diverse cultures and countries. Tracking Cranes and the International Crane Foundation offer this education project to link classrooms in the United States with students in eastern China and Russia in learning about cranes, their habitats, and their conservation. The website includes information about the birds along with links to educational activities and additional materials.
http://www.trackingcranes.org/en/indexen.htm

Tracking El Nino
This website from NOVA describes the anatomy of El Nino, links to a teacher's guide, and much more. Check out the site index for quick access to the materials.
http://www.pbs.org/wgbh/nova/elnino/

Tracking the Invasive Veined Rapa Whelk
The Bridge features a series of Data Analysis Teaching Activities (DATA) that can be used to supplement curriculum materials. The DATA *River Watch: Tracking the Invasive Veined Rapa Whelk* explores the introduction of a predatory marine snail that hails from Asian waters near Japan and Korea. In this activity, students analyze biotic and abiotic data to determine the risk of a successful rapa whelk invasion for four hypothetical estuaries.
http://www.marine-ed.org/bridge/index_archive0506.html

Tracking Narwhals in Greenland
Tracking Narwhals in Greenland is available on NOAA's Ocean Explorer website. From August 2006 to March 2007, scientists from the University of Washington and the Greenland Institute of Natural Resources will instrument 8-10 narwhals with satellite-linked time-depth-temperature recorders to track whale movements, diving behavior, and ocean temperature structure in Baffin Bay.
http://www.oceanexplorer.noaa.gov/explorations/06arctic/welcome.html

Tracking Trash
The latest report generated from data collected during the International Coastal Cleanup, Tracking Trash: 25 Years of Action for the Ocean, is available for downloading from the Ocean Conservancy.
http://www.oceanconservancy.org/our-work/marine-debris/

Trail Resources
The American Trails online library has hundreds of articles, studies, and resources on every aspect of trails and greenways. They are also archiving presentations and award

documentation from the National Trails Symposium as well as materials from other educational sessions. Topics include Trailbuilding, Planning, Education, and much more.
http://www.americantrails.org/resources/index.html

Trainer for a Day Program
Sea Research Foundation's Mystic Aquarium offers a seven-hour Trainer for a Day program where participants find out firsthand what it's like to be a marine animal trainer. The program includes hands-on animal interactions and side-by-side learning experiences with Mystic Aquarium's beluga whale, California sea lion, and African penguin trainers. Or check out the online game, Beluga University to learn about animal training tools and techniques.
http://www.mysticaquarium.org/animals-and-exhibits/encounter-programs/931-trainer-for-a-day-375-non-members-350-members
http://www.immersionlearning.org/index.php?option=com_wrapper&Itemid=239

The Transect Line
The Transect Line is an on-line or print newsletter from the Reef Check global network. Reef Check is an international program that works with communities, governments and businesses to scientifically monitor, restore, and maintain coral reef health. The newsletter features articles about Reef Check team activities, news, events, and more.
http://www.reefcheck.org/news/newsletter.asp

Trash Bash - Texas
The 2007 River, Lakes, Bays 'N Bayous Trash Bash will take place March 31, 2007 in various locations in the Houston, Texas area.
http://www.trashbash.org/

Trash Travels PSA
Dripping Springs high school student Bryce Seifert won the Trash Travels PSA contest supported by the Texas General Land Office. Check out this short, effective Public Service Announcement.
http://www.youtube.com/watch?v=DhdgJYMxcis

Travel Matters
The Travel Matters website helps students, teachers, and others learn about how their travel habits and vehicular choices affect climate change. TravelMatters offers interactive emissions calculators, on-line emissions maps, and education content that emphasizes the close relationship between more efficient transit systems and lower greenhouse gas emissions. The website includes questions, activities guides, an interactive quiz, resource lists, and more.
http://www.travelmatters.org .

Travel in Parks and Protected Areas Hangout
Check out the YouTube streamed Travel in Parks and Protected Areas Hangout, an online discussion forum streamed live July 17, 2013. Check out the hangouts on the website. Contact Ron Mader at editor@planeta.com for more information; if you have a gmail account, check out upcoming events.
http://planeta.wikispaces.com/hangout
http://www.youtube.com/watch?v=L2vDPsBKS8A&list=PLGcZwmpqrhGaIaGeZRe0STyuF-4nQGsIU

Traveling Wetland Education Trunks for Texas
Twenty-five *Wetland Education Trunks* have been distributed to educators and education centers across Texas and are available for loan to teachers. The trunks contain lesson plans, books, posters, videos, Texas Amphibian Watch materials and field equipment to guide students in their investigations of wetland habitats. The trunks emphasize learning in the classroom and in the field.
http://www.tpwd.state.tx.us/edu/

Tread Lightly! Charity Auction
Tread Lightly! will hold its 2nd Annual Tread Lightly! Charity Auction on eBay, June 1-11, 2009, with more than 175 products donated from companies across the country. All money raised will go to address recreation issues on public recreation sites and off-road trails through education, communication, and restoration/stewardship.
http://www.treadlightly.org/page.php/auction

Tread Lightly Geocaching Recommendations
Tread Lightly!'s strategic educational message, along with its training and restoration initiatives, are designed to instill an ethic of responsibility in outdoor enthusiasts and the industries that serve them. The program is long-term in scope with a goal to balance the needs of the people who enjoy outdoor recreation with the needs of the environment. The program offers recommendations for both users and managers involved in a variety of different recreational activities, including geocaching.
http://www.treadlightly.org/edu.mv?edu=Recreation%20Tips

Tread Lightly Government Resources
The nonprofit organization Tread Lightly! is a nonprofit whose mission is "To empower generations to enjoy the outdoors responsibly through education and restoration." They have developed a new web section specifically for employees of land and water management agencies. It was created to be a clear-cut, effective resource to provide aid to agencies who deal with recreation issues on their land or water.
www.treadlightly.org/govresource.mv .

Tread Lightly! Play Nice Campaign
Tread Lightly! has just completed a revamp of it's *Play Nice* Public Service Announcement Campaign, created to encourage and inspire recreationists to minimize their impact and be responsible in the outdoors. Available PSAs include fishing, personal watercraft use, and more.
http://www.treadlightly.org/edu.mv?edu=Public%20Service%20Announcements .

Tread Lightly! Slogan
In an effort to make their message stronger and clearer, Tread Lightly! has revamped their old slogan from *Leaving a Good Impression* to *Tread Lightly! On Land and Water*. The new tagline not only communicates our message effectively, but also helps reach out better to the water recreation community. In addition, the mission statement has been updated to: To proactively protect recreation access and opportunities in the outdoors through ethics education and stewardship initiatives.
http://www.treadlightly.org/

Treasures of the Flower Garden Banks
Check out this latest banner from the Flower Garden Banks National Marine Sanctuary. It highlights some of the notable features of Flower Garden Banks National Marine Sanctuary amid clusters of cascading gold coins.
http://flowergarden.noaa.gov/document_library/eddocuments.html#treasures

Treasures of NOAA's Ark: Shipwrecks!
NOAA Heritage Week 2008 highlighted the agency's role in shipwreck exploration, resource protection, safe navigation, marine forecasting, and safety at sea during a special public exhibition. The website offers a companion guide to the exhibition, featuring links to a wide variety of NOAA resources about shipwrecks, navigation, marine forecasting, educational materials, and more.
http://www.preserveamerica.noaa.gov/heritageweek.html

Treasures of NOAA's Ark - Texas
The Treasures of NOAA's Ark traveling exhibit will remain at Texas Seaport Museum in Galveston, Texas for six to nine months. Created as part of the Preserve America initiative, the exhibit highlights the history of NOAA, and components representing NOAA offices local to the hosting venue will be incorporated to introduce visitors to the many services provided and roles played by NOAA in their community.
http://flowergarden.noaa.gov/image_library/treasuresexhibit.html

Treasures in the Sea
Treasures in the Sea: Our Bahamian Marine Resources is a new resource book that provides educators with scientific information and hands-on activities. Designed especially for educators in The Bahamas, the book complements curriculum guidelines for grades three to six, though many of the activities may be adapted for younger or older students in formal and nonformal settings. The website includes the downloadable publication, links to resources related to the activities, and more.
http://treasures.amnh.org/index.html

Tree of Life: The Incredible Biodiversity of Life on Earth
This beautifully illustrated and child-friendly introduction to biodiversity, *Tree of Life,* shows how living things are classified into five kingdoms — and how each has much to tell us about all aspects of life on our planet. The book focuses on the idea that if every known species on Earth were a leaf on a tree, that tree would have 1,750,000 leaves. Since humans count for just one leaf on the tree, we have a lot to learn about the millions of other forms of life with which we share the world.
http://www.kidscanpress.com/kidscanpress/KidsCanPress_3/us_version/KCP/f_home.htm

Tree of Life Web Project
The Tree of Life Web Project is a collaborative effort of biologists and others, with links to more than 10,000 web pages. The project provides information about biodiversity, the characteristics of different groups of organisms, and their evolutionary history.
http://tolweb.org/tree/

Tri-Agency Climate Education Catalog
The TrACE Catalog includes climate education projects from NASA, NOAA, and the NSF. Visitors to the website can search for projects through an interactive map and can filter by resource type, target audience, and more.

https://nice.larc.nasa.gov/

Tribal Consultation Handbook
The U.S. Fish & Wildlife Service (FWS) has issued a new Tribal Consultation Handbook. Though the handbook has been developed for FWS staff to use in consultation with Tribes, it could be a useful tool for others.
http://www.fws.gov/mountain-prairie/tribal/documents/Tribal_Consultation_Guide_Apr_2013.pdf

Tribal Directory Assessment Tool
The Tribal Directory Assessment Tool is a web accessible database that contains information about federally recognized Indian tribes and their geographic areas of current and ancestral interest. The database links tribes' areas of interest down to the county level. Visitors can download the user manual, select by location or tribe, and more.
http://egis.hud.gov/tdat/Tribal.aspx

Triton and Patterns Projects Webquests
San Diego City Schools developed inquiry-oriented, standards-based curriculum units based on the WebQuest model. The projects are categorized by Featured Projects, Grade-Level Projects, Literature-Based Projects and Ocean-Themed Projects. Each is further divided by grade level. Check out Dive Technology, Inc., Footprints in the Sand, and much more.
http://projects.edtech.sandi.net/projects/

TROLL Top Picks
Each month the Bridge features a new TROLL Top Web Pick. Selected by our Teacher Reviewers of On-Line Learning (TROLLs) as exemplary, these sites are featured on the Bridge front page, complete with a quote from the TROLL. While every site on the Bridge has undergone the rigorous TROLL evaluation process ensuring that visitors are accessing only the top ocean sciences resources on the web, the monthly Top Picks are considered to be the top 10% of educational websites.
http://www.marine-ed.org/bridge

TROLL Top Picks Collection
The Bridge would like to introduce the TROLL (Teacher Reviewer of On-Line Learning) Top Picks Collection. Appended each month, the collection features each TROLL Top Pick dating back to April of 2005, complete with link, TROLL quote, and the month and year it was selected as Top Pick. Take a look at the collection today and if you have a great ocean science website you think could be selected as the next TROLL Top Pick, please nominate it to the Bridge.
TROLL Top Pick Collection: http://www.marine-ed.org/bridge/index_toppicks.html
Bridge TROLL Review Criteria: http://www.marine-ed.org/bridge/indexrevinstr.html
Site Nomination Form: http://www.marine-ed.org/bridge/index_nomination.html

Tropical Coastal Ecosystems - Online
Study tropical coastal ecosystems during this free, 7-week, online course, starting April 28, 2014. The University of Queensland's course will be led by Professor Ove Hoegh-Guldberg and delivered by other leaders in coastal ecology. The Massive Open Online Course is designed for resource managers, students, professionals, and others with an interest in coastal ecology and marine conservation.

https://www.edx.org/course/uqx/uqx-tropic101x-tropical-coastal-1442

Tropical Fish Rescue
The New England Aquarium Dive Club will hold a family-centered Tropical Fish Rescue in Jamestown, Rhode Island on September 28, 2013 (rain date October 5, 2013). There will be snorkeling, diving, seining, and much more. Additional activities include a kid-friendly touch tank, music, picnic, and silent auction.
http://www.neadc.org/tropicalfish/

Tropics of Sand
This sand gallery offers images of sand from different areas of the globe.
http://www.tropicsofsand.com/#!

Tsunami Aftermath: Tracking Marine Debris
Debris from the tsunami that devastated Japan last year may reach the U.S. this winter. However, there is still a large amount of uncertainty over exactly what is still floating, where it's located, where it will go, and when it will arrive. Check out this video, podcast, and story from NOAA.
http://oceanservice.noaa.gov/news/features/dec11/japan-tsunami-debris.html

Tsunami Curriculum
These websites are a small sampling of those that host background and curriculum about tsunamis.

- Asia Society K-12 Teacher's Resource Site: http://www.askasia.org/tsunami/
- Gross Point Public School System: http://www.gpschools.org/ci/tsunami.htm
- National Science Teachers Association: http://science.nsta.org/nstaexpress/nstaexpress_2004_01_10_tsunami.htm
- NOAA Intergovernmental Oceanographic Commission: http://www.prh.noaa.gov/itic/library/pubs/curriculum/tsunami_curriculum.html
- U.S. Geological Survey, Coastal and Marine Geology Program: http://temp.water.usgs.gov/tsunami/
- U.N. Atlas of the Oceans – Impact of Tsunamis on Ecosystems: http://www.oceansatlas.org/id/71687

Tsunami Debris
The NOAA Marine Debris Program is working with partners, including other NOAA offices, the shipping and fishing industry, and recreational sailors, to gather information on significant sightings of marine debris in the Pacific and on the shoreline. Check out this website for information, how to report sightings, answers to frequently asked questions, and more.
http://marinedebris.noaa.gov/info/japanfaqs.html

Tsunami Debris
The Ocean Conservancy offers this website about tsunami debris, with Tsunami Debris 101, tips on what you should do if you find tsunami debris, a field guide, and more.
http://www.oceanconservancy.org/our-work/marine-debris/tsunmi-debris-what-you-need.html

Tsunami Resources from NOAA
The NOAA Office of Education has put together a resource list of existing NOAA and NOAA Partner materials on tsunamis and tsunami safety. Resources include background information, multimedia, lessons and activities, data, and more.
http://www.education.noaa.gov/Ocean_and_Coasts/Tsunami.html

TsunamiReady
Tsunami-ready is a program sponsored by the NOAA and the National Weather Service. It sets minimum guidelines for a community to be awarded tsunami-ready recognition. The requirements include establishing an emergency operations center; having the capability to provide tsunami warnings using sirens and local media; developing a tsunami hazard plan and community awareness program; and the ability to receive tsunami warnings from the weather service. For an example of a TsunamiReady community workshop, check out the South Slough National Estuarine Research Reserve website. http://egov.oregon.gov/DSL/SSNERR/resourcelibrary.shtml
http://www.tsunamiready.noaa.gov/

Turbulence Webinars
COSEE-Ocean Systems offers archives of the three-part Turbulence Webinar series. The series focuses on the physics of ocean turbulence and its effect on marine organisms.
http://cosee.umaine.edu/programs/webinars/turbulence/

TurfMutt
TurfMutt - Saving the Planet One Yard At A Time, is an environmental education program for grades K-5, offering free science-based, standards aligned curriculum, activities, and more. TurfMutt aims to inspire kids to get outside, explore nature in their communities, and learn about the value of plants and green space.
http://www.turfmutt.com/#

Turning the Tide: The Eradication of Invasive Species
The Hawaiian Ecosystems at Risk Project (HEAR) provides technology, methods, and information to decision-makers, resource managers, and the general public to help support effective science-based management of harmful non-native species in Hawaii and the Pacific. These articles from the Proceedings of the 2001 International Conference on Eradication of Island Invasives, Auckland, New Zealand, along with other pertinent articles, have been posted on the website under “Online full-text articles”.
http://www.hear.org/index.html .

Turtle Poster
Ecology Project International is offering a free Sea Turtles of the World poster to educators, for use as a classroom learning tool.
http://www.ecologyproject.org/promo/free_conservation_poster

Turtle Talks Activity Book
Turtle Talks is a youth conservation eco-literacy project. A team member authored a downloadable children’s activity book on sea turtles.
http://www.oceana.org/fileadmin/oceana/uploads/reports/TurtleTalks_en.pdf

Twists in the "Name That Jellyfish Contest"
As often happens in science, there has been an unexpected twist in the process of naming the Bonaire Banded Box Jellyfish. While the contest is over, there is more to the process than expected. Check out this website for another example of the scientific process.
http://www.yearofscience2009.org/themes_ocean_water/general/top-seven-jellyfish-names.html

Twitter for Teachers
Edutopia's Five-Minute Film Festival offers links to using Twitter in education, videos that will help you learn to use the social platform for networking, resources, and more.
http://www.edutopia.org/blog/film-festival-twitter-education

Twitter Teaching
This blog reviews a Twitter Teach-In on bycatch. Visitors can read the transcript of the lecture, including questions and comments from participants, and see if this online teaching method could be of interest.
http://rjd.miami.edu/conservation/bycatchteachin-teaching-a-marine-biology-class-live-over-twitter

Two Minutes on Oceans
The United Nations Environment Programme (UNEP) is partnering with cartoonist Jim Toomey (of Sherman's Lagoon fame) in developing a series of six two-minute videos intended to raise awareness of the importance of oceans and the coastal environment. The videos use animation and humor to explain in clear and simple language the role oceans play in our lives and our very survival. The first video can be viewed on the website now, while others will be launched over the next six months.
http://www.rona.unep.org/toomey/

uBio
The Universal Biological Indexer and Organizer (uBio) is a comprehensive database of known scientific and common names of living (and once-living) organisms. The Taxonomic Name Server catalogs names and classifications to enable tools that can help users find information on living things using any of the names that may be related to an organism.
http://www.ubio.org/

Ultimate Squid Dissection
Paul Detwiler offers a 9-minute video that provides marine biology teachers with an overview of a dissection of the market squid, *Loligo opalescens*, along with accompanying materials, including a cephalopod adaptations lab. The video illustrates the squid's external and internal anatomical structures to enable teachers to lead and assist their students in dissecting this species in the classroom.
http://www.nmeaweb.org/gatlinburg2010/0721_215.html
http://www.kendallhunt.com/detwiler/

UN Atlas of the Oceans Newsletter
The UN Atlas of the Oceans newsletter provides a round-up of the latest activity on the website, including most recently added topics, content, and special happenings such as new partnerships or awards. Recent additions include information about arctic ecosystems. To subscribe, click on "join now" under the search function.

http://www.oceansatlas.org/ .

UN Report on Mangroves and Coral Reefs
The United Nations Environment Programme (UNEP) recently released its report on corals and mangroves, *In the Front Line: Shoreline Protection and other Ecosystem Services from Mangroves and Coral Reefs*. The report was produced by UNEP's World Conservation Monitoring Centre in collaboration with the International Coral Reef Action Network and the World Conservation Union. Among the report highlights are environmental and estimated economic value of coral reefs.
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=466&ArticleID=5112&l=en

Uncovering Earth's Secrets
Uncovering Earth's Secrets: Science and Adventure on the JOIDES Resolution is a free children's picture eBook about the explorations and science of the JOIDES Resolution. It is written for elementary age kids and shows how the JOIDES Resolution offers scientists the opportunity to learn about volcanoes, earthquakes, and more. The book is available as a free download and can be viewed on iPads and other computer and tablet devices, including interactive whiteboards.
http://joidesresolution.org/node/2998

Underground Rivers
Professor Emeritus Richard J. Heggen of the University of New Mexico has written the book*, Underground Rivers from the River Styx to the Rio San Buenaventura with occasional diversions*, and offers it free for downloading online. Chapters include The Concept of Circulation, Lava Tubes, The Biology of Underground Rivers, and much more. The book includes chapters on underground rivers from the point of view of mythology, literature, and science.
http://www.unm.edu/~rheggen/UndergroundRivers.html

Understanding Climate Toolkit
The American Geological Institute, in conjunction with Earth Science Week 2009 (October 11–17), released a new toolkit that enables students, educators and the general public to explore this year's theme, *Understanding Climate*. The 2009 Earth Science Week Toolkit features a variety of educational climate resources from the USGS, NASA, and NOAA. The toolkit is available for the cost of shipping and handling.
http://www.earthsciweek.org/materials/

Understanding Ocean Acidification
The Sanctuary Education Team, a working group of the Channel Islands National Marine Sanctuary Advisory Council and partners, offers an Understanding Ocean Acidification website with videos and downloads of workshop presentations, hands on activities, and more. Check out the lesson plans and links to additional resources.
http://cisanctuary.org/acidocean/

Understanding Plate Motions
This website, from the U.S. Geological Survey, provides an introduction to the motions of tectonic plates. Descriptions and examples of each of the four types of plate boundaries are presented along with illustrations of the motions associated with each.
http://pubs.usgs.gov/gip/dynamic/understanding.html

Understanding and Responding to Climate Change
This downloadable National Academy of Sciences booklet presents recommendations from the National Academies' many expert reports on climate change, in an easy-to-read format. The 2008 edition of *Understanding and Responding to Climate Change* includes an expanded section on impacts and updated figures and graphics.
http://dels.nas.edu/dels/rpt_briefs/climate_change_2008_final.pdf

Understanding Science
The Understanding Science website aims to communicate what science is and how it works. The site, intended for both the general public and K-16 teachers, draws visitors into real-life examples and looks at the social side of science, science and society.
http://undsci.berkeley.edu/

Understanding Sustainability
Understanding Sustainability is a flexible, self-contained 1-2 week curriculum unit aligned with national science standards for middle school educators to teach sustainability issues from Facing the Future. This curriculum features hands-on activities that explore sustainability issues, such as energy, consumption, water scarcity, along with potential solutions. Free versions may be available for Washington and Alaska.
http://www.facingthefuture.org/Home/CurriculumDetails/tabid/131/Default.aspx?ItemID=NATUS

Underwater Google Street View
Google Street View splashes into the ocean through a coral reef off the coast of Australia. Now visitors can swim through a coral reef, visit Scott's Hut in Antarctica, go down the Amazon, and walk the streets of New York -- all while sitting at their desks.
http://maps.google.com/help/maps/streetview/gallery.html

Underwater Universe
The History Channel offers Underwater Universe. Throughout history, tidal waves, storm surges, hurricanes and cyclones – fueled by the ocean – have wreaked great destruction on the cities and people in their path. *Underwater Universe* tracks the history and evolution of the ocean's seven deadliest zones. This program helps explain to viewers the how and floods, tsunamis, hurricanes, whirlpools, and underwater volcanoes develop.
http://www.history.com/schedule.do?action=daily

Underwater Video Feeds
Save the Blue hosts live video feeds from an offshore production platform in the U.S. coastal waters of the Gulf of Mexico, at 32 and 88 feet below the water line.
http://www.save-the-blue.org/live-video/

Underwater Videos Available On-Line
The Perry Institute for Marine Science / Caribbean Marine Research Center posts three educational videos to provide a glimpse at our underwater environments, including MPAs, coral reefs, and Nassau Grouper.
http://www.cmrc.org/pubs.htm

Unearthing Tse-whit-zen
The Seattle Times published a special report, May 22-25, 2005, about the Tse-whit-zen archaeological site uncovered by the Washington Department of Transportation on the Port Angeles waterfront in August 2003. Working side by side, archaeologists and tribal members have uncovered burials, the remains of many structures, and signs of human activity dating back at least 2,700 years. The website includes background information, a narrated slideshow, and a study guide.
http://seattletimes.nwsource.com/news/local/klallam/index.html

UNEP Publications on Water & Waste Management and Tourism & Biodiversity
A Manual for Water and Waste Management: What the Tourism Industry Can Do to Improve Its Performance looks at solid waste and water management and provides guidelines and examples of how tourism operations can achieve positive results. *Tourism and Biodiversity: Mapping Tourism's Global Footprint*, illustrates the overlap between tourism development and biodiversity hotspots.
http://www.uneptie.org/pc/tourism/library/mapping_tourism.htm
http://www.uneptie.org/pc/tourism/library/waste_manual.htm

UNEP Portal
The United Nations Environmental Programme Network provides a global portal to authoritative environmental information based on themes and regions. Some thematic portals include climate change, freshwater, and a geo-data portal with many marine data sets. Information includes announcements and news, initiatives, and resources.
http://www.unep.net/

UNEP Year Book 2013: Emerging Issues in our Global Environment
The 10th edition of the Year Book series from the United Nations Environment Programme focuses on rapid change in the Arctic which threaten ecosystems while providing new development opportunities, including easier access to oil and gas, minerals, and fisheries. Additional focus includes minimizing chemical risks, poaching in Africa, growing urban environmental challenges, and the accelerating momentum to tackle short-lived climate pollutants.
http://www.unep.org/yearbook/2013/

UNEP Year Book 2008
The UNEP Year Book 2008 highlights the increasing complexity and interconnections of climate change, ecosystem integrity, human well-being, and economic development. It examines the emergence and influence of economic mechanisms and market-driven approaches for addressing environmental degradation, and it describes recent research findings and policy decisions that affect our awareness of and response to changes in our global climate and environment. It is available in English, Spanish, and French.
http://www.unep.org/publications/search/pub_details_s.asp?ID=3980

United Kingdom Wildlife Overseas
The UK's Wildlife Overseas: a stocktake of nature in our Overseas Territories, offers a first look at biodiversity in the United Kingdom's Overseas Territories. The government has limited information on what species or habitats are present, what protections have been established, or which species may be at most imminent risk of extinction.
http://www.rspb.org.uk/ourwork/projects/details/369443-the-uks-wildlife-overseas-a-stocktake-of-nature-in-our-overseas-territories

United Nations Atlas of the Oceans
The Atlas is an information system designed for use by policy makers, scientists, and students who need access to underlying data bases and approaches to sustainability. The information includes history, biology, climatology, food security, fishing, and more.
http://www.oceansatlas.org/

Universcale
Created by Nikon, this website provides insight into the subject of scale and comparing and understanding things which cannot be physically compared.
http://www.nikon.co.jp/main/eng/feelnikon/discovery/universcale/index.htmv

University of Wisconsin-Madison Zoology Museum Collection
From the University of Wisconsin-Madison digital collections, the Zoology Museum Collection includes digitized versions of heavily illustrated biological journals, a few dated as early as 1859 with the majority from the first half of the 20th century. In addition to searching, journals can be displayed in a gallery view, allowing users to jump quickly to pages of interest. The Galápagos Collection includes skeletons, slides, pictures, books, and research papers collected and produced by UW-Madison scientists and researchers during ten expeditions to the Galápagos since 1969.
http://digicoll.library.wisc.edu/Zoology/

The Unnatural History of the Sea.
Callum Roberts' book, *The Unnatural History of the Sea*, relates a history of ocean life in words and pictures. Using accounts of sea adventures from explorers, fishermen, pirates, merchants, and travelers, he explores hundreds of years of exploration and exploitation of the sea. Check out previews of the book on the website and through Internet search engines.
http://www.historyofthesea.org/

Untold History of Women in Science and Technology
The White House hosts this website of a set of stories about female pioneers in the STEM fields, told by women in government.
http://www.whitehouse.gov/women-in-stem

Upcoming BRIDGE Changes
Throughout the fall, the Bridge's website technology will be improved to make the site more useful for ocean science teachers. The Bridge will be database-driven; use a more productive search engine; have enhanced navigation featuring a rollover menu include an updated color scheme, and highlight sections spotlighting a bridge data lesson plan, teacher top pick of the month, and breaking ocean science education news. Visit the website to see the changes over the coming months.
http://www.marine-ed.org/bridge

Updated FEMA Flood Map Service Center
The updated Federal Emergency Management Map Service Center offers free enhanced searches, multi-file downloads, and more.
https://msc.fema.gov/portal

Upwell Curation Criteria
For those looking to increase public attention to issues of interest, check out this article from Upwell on the criteria they use to select content for their blogs and more.

http://www.upwell.us/why-we-choose-what-we-choose-upwell-curation-criteria

Upwell and the Tide Report
Upwell is an organization focused on online conversations with the aim to "make the ocean more famous on the internet." They monitor and analyze online conversations, lead data-driven attention campaigns, and share the information gathered with the marine sector. The Tide Report newsletter offers ocean news, analysis of online conversations, upcoming science and ocean communication events, and more. Check out the Vote4theOcean campaign
http://www.upwell.us/

Upwelling Zones
Upwelling Zones is a resource to help learners understand the importance of marine upwelling systems, including ties to fisheries, El Nino, and La Nina events. Users can interactively track and analyze temperature, wind, salinity and chlorophyll data. Other features include a user guide, movies, links to published research, and summaries of relevant background topics. Worksheets and accompanying rubrics are designed to help educators assess student understanding of various topics.
http://www.bigelow.org/upwelling

Urban EE Resources for High School Teachers
The LEAF Anthology of Urban Environmental Education is available online. The anthology is a collection of lessons and activities designed to help high school educators infuse urban environmental themes into their curriculum. Sections include Natural Cities, Human Cities, and Evolving Cities.
http://www.nature.org/about-us/careers/leaf/resources-for-teachers/leaf-anthology-of-urban-environmental-education.xml

Urban Environmental Education Lesson Plans
These 26 lesson plans are an outcome of the 2011 online professional development course through the EECapacity project at Cornell University. Plans include Ecological Identity; Restoring Earth, Reflecting on Stories; Marine Ecosystem Invention; and more.
http://urbanee.files.wordpress.com/2011/11/26-lesson-plans.pdf

Urban Forest Hurricane Recovery
The Urban Forest Hurricane Recovery website from University of Florida Extension offers disaster preparedness and recovery topics. Chapters include Restoring Trees after a Hurricane, Selecting Coastal Plain Species for Wind Resistance, and much more. The website links to many other resources available through EDIS (Electronic Data Information Source), including a variety of handbooks and guides. Be sure to check out Environment under the Topics tab.
http://edis.ifas.ufl.edu/features/series/hurricanerecovery.html

Urban Protected Areas
The Nature of Cities, an online collective forum on cities as ecosystems, offers an on-line article on urban protected areas. The IUCN website offers a downloadable guide, Urban Protected Areas - Profiles and best practice guidelines.
http://www.thenatureofcities.com/2014/10/08/urban-protected-areas-important-for-urban-people-important-for-nature-conservation-globally/
https://www.iucn.org/about/union/secretariat/offices/usa/?14829/Urban-Protected-Areas---Profiles-and-best-practice-guidelines

Urban Protected Areas: Profiles and Best Practice Guidelines‘
The IUCN offers Urban Protected Areas: Profiles and Best Practice Guidelines, available for free download.
http://www.iucn-urban.org/

U.S. Antarctic Program
This website from the National Science Foundation offers information about the world’s coldest, windiest, driest, and harshest continent - its ecosystems and its effects on global processes such as climate. Read breaking news from a newspaper written in McMurdo Station, Antarctica. See articles about a killer crater found under the ice, the melting of polar ice sheets, video clips, maps, images, and much more.
http://www.usap.gov/scienceAndEducation.cfm

USA Science and Engineering Festival
The inaugural USA Science and Engineering Festival, October 10-24, 2010 in Washington, D.C., is the country’s first national science festival, a grassroots collaboration of over 500 of the nation’s leading science organizations. A number of events are scheduled to take place in Washington and around the nation, culminating with a free, two-day Expo on the National Mall.
http://www.usasciencefestival.org/

Use Sea Turtles in Your Next Lesson
Sea turtles can be used to demonstrate concepts in many facets of the ocean sciences. For an activity in ecology, explore the Bridge DATA: See Turtles Nest, See Turtles Hatch, which evaluates nesting and hatching data from a community organization in Kenya. Or, if you would like to incorporate bycatch in your next unit, see Off the Hook!, where students use National Marine Fisheries Service data to examine the use of J-hooks versus circle hooks. For physical and biological oceanography, see our Scientist Spotlight on Kate Mansfield, a sea turtle biologist, which contains a sea turtle tracking activity. The Bridge also has sea turtle links to teacher-reviewed external resources for even more information.
See Turtles Nest, See Turtles Hatch http://www.marine-ed.org/bridge/index_archive0700.html
Off the Hook! http://www.marine-ed.org/bridge/index_archive0404.html
Scientist Spotlight: Kate Mansfield http://www.marine-ed.org/bridge/index_mansfield.html

The Use of a Piece of Land
This role-playing activity engages students in land use planning, helping to reinforce the positive and negative aspects of land use laws and local zoning ordinances. Using photographs or color slides and a legal description (deed) of a choice piece of relatively undeveloped real estate in their area, students work in groups to select a proposed use for the parcel, research pertinent ordinances or planning reports, and develop a case as to why the land should be put to that use. Be sure to heck out the other resources, too.
http://www.maine.gov/doc/nrimc/mgs/education/lessons/act02.htm

U.S. Fish and Wildlife Service National Digital Library
The U.S. Fish and Wildlife Service’s National Digital Library is a collection of images, historical artifacts, audio clips, publications, and video. There are twelve thematic

sections, including Aquatic Species, Law Enforcement, Connecting People with Nature, and more. Items can be searched by key word or through the advanced search feature.
http://digitalmedia.fws.gov/cdm/

USGS Education Resources
The United States Geological Survey (USGS) offers a myriad of resources for teachers and students. Discover curricular ideas, scientific data, maps, and other resources to support biology, geology, hydrology, climate change, and much more. Spend some time looking through this extensive collection of materials. Check out the USGS Education Resources Handout and Educational Fact Sheets on the right side of the screen. Videos and Animations categorized links include climate change, careers, tsunamis, and more. Or browse all resources is by grade level, further broken down by biology, geography, geology, and water resources. Check out the subcategories.
http://education.usgs.gov/

U.S. Geological Survey Educational Resources
The U.S. Geological Survey (USGS) provides scientific information intended to help educate the public about natural resources, natural hazards, geospatial data, and issues that affect our quality of life. The website includes links to selected online resources, including lessons, data, maps, and more, to support teaching, learning, education, and research. The educational resources are broken up by grade level for easier selection by teachers, with materials for teaching about GIS, links to publications, links to popular USGS websites about volcanoes, water resources, coastal storms, and much more.
http://education.usgs.gov/index.html

USGS Education Resources
The United States Geological Survey offers a myriad of resources for teachers and students. Discover curricular ideas, scientific data, maps, and other resources to support biology, geology, hydrology, climate change, and much more. The website has been updated to make resources even easier to find. Check out the education resources by grade level (K-6, 7-12, undergraduate). review archived online lectures, download maps, and much more.
http://education.usgs.gov/index.html

USGS Global Visualization Viewer
GloVis is an interactive viewer providing access to satellite imagery for virtually any point on the Earth. Users can select a satellite and sensor and either type in latitude and longitude or click on a point on the index map. The viewer will show a mosaic of the most recent cloud-free satellite browse images around the point selected, along with metadata. Users can also navigate to adjacent images, create and modify scene lists, and more. A user's guide is included.
http://glovis.usgs.gov/

USGS Image Galleries
The USGS offers links to maps, imagery, and publications available on United States Geological Survey websites. Highlights include the USGS Video and Image Gallery with links to videos, photography, and audio collections; the EROS Image Gallery - Earth as Art with images from aerial photos and satellites; Global Change featuring satellite images showing global change; TerraLook with data sets which can be combined to create a time series of images; and much more.
http://www.usgs.gov/pubprod/aerial.html

U.S. Geological Survey Photographic Library
Employees with the U.S. Geological Survey have taken many, many, photographs in the course of their various geological studies and explorations, documenting volcanic explosions, national parks, and more. This website contains 30,000 photographs from 1868 to the present, and offers free downloading of the images. The thumbnails load quickly and each is accompanied by a brief description.
http://libraryphoto.cr.usgs.gov/

U.S. Global Change Research Information Office
The US Global Change Research Information Office provides access to data and information on climate change research, adaptation/mitigation strategies and technologies, and global change-related educational resources on behalf of the various US Federal Agencies that are involved in the US Global Change Research Program. The website offers downloadable documents, *Ask Dr. Global Change* with links to useful information, and more.
http://www.gcrio.org/

USGS CoreCast
The United States Geological Survey has launched a podcast series, *It's natural science from the inside out*. The podcasts range in length from two to fifteen minutes and cover a wide range of topics, including geologic maps, polar bear research, hazards, and more. The transcription of each episode is also available on the website.
http://www.usgs.gov/corecast/

USGS Data Delivery and Mapping Over the Web
The National Water-Quality Assessment Program offers a downloadable fact sheet, *Data Delivery and Mapping Over the Web – National Water-Quality Assessment Data Warehouse*. The warehouse integrates data on water quality, ecology, and hydrology across the nation, providing consistent, online collections of water-quality data and associated information. Included are chemical concentrations in water, sediment, and aquatic-organism tissues; biological community data for algae, fish, and invertebrates; daily streamflow and temperature information for selected sampling sites; and more.
http://pubs.usgs.gov/fs/2006/3101/

USGS Learning Web
As the Nation's largest water, earth, biological science, and civilian mapping agency, the U.S. Geological Survey (USGS) provides some of this science information as educational material. The product line includes a variety of teaching packets, booklets, posters, fact sheets, and CD-ROMs. There are also materials for students, including trivia games, clip art, homework help, and much more. Lesson plan and activity topics currently include mud fossils, global change, geological age, and more.
http://interactive2.usgs.gov/learningweb/textonly/index.htm

Using Fish Population Data
This guide in the NSDL, *Exploring Marine Conservation in the Classroom: Using Fish Population Data*, introduces teachers to the use of data on fish species diversity and relative abundance in the classroom. Students learn to interpret the data to understand diversity and abundance; understand the interpretation and use of parameters derived from population data such as density and sighting frequency; and use the data to make and test predictions about relationships between habitats and species.

http://serc.carleton.edu/usingdata/datasheets/REEF.html

Using Games to Advance Coastal and Marine Management
The latest issue of *Marine Ecosystems and Management* Vol. 5, No. 6 offers an article on using games to advance coastal and marine management. Examples include SimIsle; Go Fish, No Fish; Trade-Off!; and more.
www.meam.net

Using NASA's Global Climate Change Website
NASA offers Tips 'n' Tricks for Teachers, a downloadable resource with six tips to help teachers use the NASA Global Climate Change website in the classroom.
http://climate.nasa.gov/TipsandTricks/TipsNTricksTipsheet_11-20-10.pdf

Using Photorealistic Visualizations
NOAA's Coastal Services Center offers the publication, Using Photorealistic Visualizations. The document introduces various types of visualizations, or simulated images, with a focus on photorealistic visualization. Topics include types of visualizations, examples, things to consider when creating your own visualizations, and sharing visualizations with stakeholders.
http://www.csc.noaa.gov/digitalcoast/publications/visualizations

Using Real Time Data Resource Guide
Hatfield Marine Science Center offers this guide containing links to a host of Internet sites that have real-time data. These sites can enhance traditional classroom lessons with students using real-time data to investigate earth systems. Categories include Best Practices and Tips, Understanding Satellite Imagery, Projects, and Real-Time Data Resources.
http://hmsc.oregonstate.edu/visitor/sites/default/files/education-programs/docs/Using-Real-time_Data.pdf

U.S. Ocean Policy Report Card
The Joint Ocean Commission Initiative released its third annual U.S. Ocean Policy Report Card, which assesses the nation's progress in 2007 toward implementing the recommendations of the U.S. Commission on Ocean Policy and the Pew Oceans Commission, as well as the actions described in the Administration's U.S. Ocean Action Plan. The objective of the Report Card is to inform policy makers and the public of the challenges facing our ocean while identifying the many opportunities ripe for action.
http://www.jointoceancommission.org/

USS *Arizona* Preservation Project – Daily Project Updates
Archeologists from the Submerged Resources Center of the U.S. National Park Service conducted a three-week investigation of the wreck of USS ARIZONA. Using nondestructive techniques, the team conducted tests to determine the structural integrity of the ship, record in detail its current state for comparison with earlier surveys, and collect environmental data in the interior of the ship using remotely-operated vehicles. Daily updates on the team's activities will be posted to the project website.
http://www.pastfoundation.org/Arizona/,
http://www.nps.gov/submerged .

USS Monitor Center
The USS Monitor Center illuminates the individual human stories of those who designed and built the *Monitor* and the *CSS Virginia* and sailed them into battle on March 8 and 9, 1862. The Center will also highlight NOAA archaeologists, scientists and U.S. Navy divers who worked on the project. The website offers information about the history, life aboard the ship, and museum preservation efforts. Bibliography, links, and educational resource pages provide jumping off points for learning more about the USS Monitor, the CSS Virginia, the Civil War and the men and women who lived through it.
http://www.monitorcenter.org/

Utubersity Educational Videos
Utubersity organizes and displays educational videos from YouTube and other sites. Videos feature full-length lectures, documentaries, and conferences on subjects including biology, education, geology, oceanography, and more.
http://utubersity.com/

Vadlo Search Engine
The Vadlo search engine caters to all branches of life sciences. This beta offering allows users to search within five categories: Protocols, Online Tools, Seminars, Databases, and Software. Seminars are essentially PowerPoint files for presentations, lectures, and talks. Databases will take you to databases, resources, compilations, and more.
http://www.vadlo.com/

Vailulu'u: Eel City and the Moat of Death
NOAA's Ocean Explorer has posted information from recent expeditions to the waters around American Samoa. Vailulu'u is an underwater volcano that lies approximately 20 miles east of Ta'u Island in American Samoa. The crevices of the volcano are occupied by thriving aggregations of cutthroat (synaphobranchid) eels which had never before been studied in their natural habitat. Find a summary of this expedition, a slideshow of marine life around Vailulu'u, and video of swarming underwater eels on the website.
http://oceanexplorer.noaa.gov/explorations/05vailuluu/welcome.html

Valoración Socioeconómica de los Humedales en América Latina y el Caribe
Wetlands International wishes to join the celebration of World's Wetlands Day by launching its recently published booklet, *The Socio-economics of Wetlands Valuation in Latin America and the Caribbean,* in Spanish. This publication explains in a simple way the fundamentals of the socioeconomic valuation of wetlands and its role in the decision making processes, highlighted by five case studies from Peru, Venezuela, Cuba, Brazil, Argentina, and Guatemala. This publication can be downloaded for free.
http://www.wetlands.org/publications.aspx

Valuation of Marine Ecosystem Goods and Services
The Valuation of Marine Ecosystem Goods and Services in the Wider Caribbean Region provides a summary of economic analyses of marine ecosystem services in the Wider Caribbean Region for the three major marine ecosystem types being addressed by the Caribbean Large Marine Ecosystem Project: reef, pelagic, and continental shelf. Particular attention is given to empirical valuation studies, and advantages and disadvantages of alternative methods are discussed.
http://cermes.cavehill.uwi.edu/Technical_Reports/Schuhmann_2012_WCR_marine_resource_valuation_CTR_63.pdf

Valuing the Environment in Small Islands - An Environmental Economics Toolkit
The purpose of this toolkit from the Joint Nature Conservation Committee is to demonstrate how to estimate the economic value of the benefits that the environment provides to people in small islands, and incorporate these values into decisions. It has been designed primarily for government officials and NGOs, but is also useful for others wanting to estimate the value of ecosystems and ecosystem services.
http://www.jncc.gov.uk/page-4065

Vegevaders
This board game allows students to experience through game-play the continuing co-evolution between plants and their microbial pathogens that occurs during the battle to detect/defend (plants) versus evade/invade (pathogens).
http://pseudomonas-syringae.org/Outreach/EduOutreach-Vegevaders/EduOutreach-home.html

Venomous & Poisonous Creatures
Sea World Busch Gardens offers a variety of educational activities on its website. In honor of Halloween, it is highlighting activities and information about venomous and poisonous creatures.
http://www.swbg-animals.org/just-for-teachers/lsa/2009/oct/index.htm?src=animalssilverpoplsaoct09-animalactivities

VentureDeepOcean
VentureDeepOcean shares mid-ocean ridge and hydrothermal vent exploration with audiences around the world. Designed as an information portal, the site features current scientific research and cruises, deep-sea news, background information, images, and more. Ridge 2000 is an interdisciplinary program focused on integrated studies of Earth's oceanic spreading centers. The program provides national coordination for studies of deep-sea hydrothermal vents and rifting of volcanic crust.
http://www.venturedeepocean.org/

The Video Project
The Video Project offers educational media and documentary programming on global and social issues, science and health. Subjects include Aquatic Life, Arctic Studies, Coral Reefs, and much more. The new release, Climate Change: Coral Reefs on the Edge, can be viewed in its entirety online; the purchased DVD classroom version includes four learning modules, a teacher's guide, student activities, and more.
http://www.videoproject.com/index.html

Virginia Seaside Heritage Program
The Virginia Seaside Heritage Program is a public-private partnership, initiated and funded by the Virginia Coastal Program to address management of the aquatic resources of the barrier islands, bays, and salt marshes along Virginia's Eastern Shore. The program will build on the momentum of recent restoration successes, like those witnessed in the Virginia Oyster Heritage Program.
http://www.deq.virginia.gov/coastal/vshp/homepage.html

Virginia's Water Resources—A Tool for Teachers
This downloadable book offers information and activities for teachers to support interdisciplinary and problem-based teaching about watersheds, water quality, stewardship, and management issues.
http://www.longwood.edu/cleanva/teachersvawatercurriculum.htm

Virtual Barrier Island
Partners have developed a 3-D virtual model of the Gulf of Mexico and Texas coastal environments. The model can be used in the classroom and by the general public to explore how relative sea level change rise, caused by climate change and other causes, may impact the coastal zone. The website offers the downloadable 3-D model, a lesson plan, teacher's introduction, and a virtual reality video which explains how to navigate and manipulate the data within the model.
http://coastal.beg.utexas.edu/thscmp/vbi.htm

Virtual Courseware
As part of a collaborative project between faculty members at the California State University-Los Angeles and the National Science Foundation, the Virtual Courseware website brings together a number of thematic instructional resources for science educators. Activities teach about earthquakes (in English and Spanish), rivers, global warming, and more. The website offers a mix of activities, assessment exercises, and instructor materials.
http://www.sciencecourseware.org/eecindex.php

Virtual Cruise to Fagatele Bay
These pictures and videos detail a research cruise and Pisces V submersible dives to the coral reefs of Taema Bank and Fagatele Bay and Canyon, Tutuila, American Samoa, on the Hawai'i Undersea Research Lab Cruise in July, 2005.
http://dusk2.geo.orst.edu/djl/samoa/hurl/

Virtual Field Trips Database
The University of Texas Library hosts links to a collection of virtual field trips and guides throughout the United States and Canada. The sites contain local geological or earth science information and include links to downloadable versions of published paper texts. One selection takes you to the Carolina Coastal Science website, an inquiry-based science resource that explores science in coastal Carolina. Visit barrier islands, the Channel Islands, Hawaii, and more through the database.
http://www.lib.utexas.edu/geo/onlineguides.html

Virtual Hurricane Classroom
This collection of resources on hurricanes from the SouthEast U.S. Atlantic Coastal Ocean Observing System (SEACOOS) includes a selection of activities in which students investigate storm surge, learn hurricane terminology, build and use their own weather instruments, and learn how to locate and plot points on a map using latitude and longitude. There is also a downloadable poster that explains the causes of hurricanes, hazards associated with them, and hurricane facts for the southeast Atlantic U.S.
http://seacoos.org/Community%20and%20Classroom/hurricane-classroom

Virtual Library in Spanish
This Spanish library provides a compilation of documents in Spanish for environmental educators which include experiences, guidelines, multimedia, educational material, and other helpful information.
http://www.reambi.org/biblioteca-virtual

Virtual Marine Scientist
The Virtual Marine Scientist resource aims to familiarize high school students with the conditions in which marine scientists work and research is carried out. In this virtual environment, students discover how to design and run experiments in marine environmental science and manipulate real scientific data from their own experiment. Request a login ID and check this out.
http://www.virtualmarinescientist.com/#

Virtual Museum of Nautical Archaeology
Texas A&M University's Institute of Nautical Archaeology brings you the Virtual Museum of Nautical Archaeology. It includes images, history, and site reports from three decades of projects around the world, along with links to other sites.
http://ina.tamu.edu/vm.htm

Virtual Polar Field Trips
The Alaska SeaLife Center and COSEE-Alaska, supported by the National Science Foundation, are developing a series of virtual field trips designed to immerse kids in grades 5-8 in polar research. *Meltdown* is an interactive, online science curriculum designed to teach students about the Bering Sea ecosystem, specifically the role of sea ice algae in the spring food web. The website offers linked curricula, a teacher's guide, and additional materials.
Contact education@alaskasealife.org
http://www.alaskasealife.org/New/education/VFT/SEA_ICE_MELT_DOWN/SeaIceVFT_Introduction.php

Virtual Pond Dip
The Virtual Pond Dip introduces some common types of pond life organisms and encourages an exploration of a real pond. Students click on each organism to learn more; the Pond Life Identification Kit offers more detail.
http://www.microscopy-uk.org.uk/index.html?http://www.microscopy-uk.org.uk/ponddip/

Virtual Presentation Assistant
The Virtual Presentation Assistant is an online tutorial dedicated to the art and skill of public speaking, and the website is maintained by the staff of the communication studies department at the University of Kansas. The site covers such topics as selecting an appropriate theme for a speech, how to research said speech, supporting your primary points, and links to other sites that deal with the subject at hand.
http://www2.ku.edu/~coms/virtual_assistant/vpa/vpa.htm

Virtual Squid Dissection
This page from The Biology Corner can be used as a substitute for a hands-on squid dissection. Students without access to squid, or who were absent the day of the dissection, can view photos of the squid and complete the lab guide.
http://www.biologycorner.com/worksheets/squid_virtual.html

Virtual Submersible Dive
Take a virtual tour of the Monterey Bay National Marine Sanctuary using a single-person submersible called DeepWorker 2000. Explore the canopy of a kelp forest and watch sea lions dart by in search of food. This virtual dive was developed in partnership with the National Geographic Society.
http://www.nationalgeographic.com/monterey/ax/primary_fs.html

Virtual Take Our Daughters and Sons to Work Day
The OceanAGE Virtual Take Our Daughters and Sons to Work Day, April 28, 2005, offers students the opportunity to discuss and celebrate oceanography career options. Students will be able to interact with inspiring mentors throughout the day in live webchats and online forums. The complete profiles, video interviews of the scientists, and live event instructions will be available on the website.
http://oceanexplorer.noaa.gov/edu/oceanage/welcome.html

Virtual Team Challenge – Spill!
The Virtual Team Challenge from Deloitte is a Virtual World 3D simulation-based learning curriculum for high school teachers and students for Fall 2009. The Virtual Team Challenge will give participants a taste of the different aspects of working as an employee of a fictional professional services firm. Every participant will fulfill one of several roles on a simulated professional services team and compete against other teams to clean up an oil spill in the river of New City.
http://www.virtualteamchallenge.com

Virtual Tour of NOAA's Ark
Treasures of NOAA's Ark: Journey Through Time can be visited via a virtual tour to learn more about NOAA's 200 years of science, service and stewardship.
http://www.preserveamerica.noaa.gov/hw07_photo1.html

Virtual Urchin
Sea urchin gametes are easy to use, developmental stages are readily seen with the microscope. The goal of this website is to make these remarkable embryos readily accessible through development of inquiry based lessons, including larval development and metamorphosis, community ecology, pollution in the marine environment, and more. Check out the microscope tutorial and the latest virtual lab, on ocean acidification.
http://virtualurchin.stanford.edu/

Virtual Vacationland
This website from Bigelow Labs helps you find and use web-based earth science data and information. Content is arranged by topic with land topography; bathymetry; coastal tides; ocean buoy data; ocean temperature; weather and climate; and watersheds and rivers. In addition to information about how to access the on-line data, each topic has background information, terminology, key questions, web links, images, and animations. There are also links to hands-on activities.
http://www.bigelow.org/virtual/

Virtual Volcano
The Discovery Channel offers this virtual volcano website with interactive features. Visitors build their own volcano and watch it erupt, or read brief overviews of different features.
http://dsc.discovery.com/convergence/pompeii/interactive/interactive.html

Virtual Voyage to the Marianas
The research vessel Oscar Sette will be on an expedition in the Marianas Archipelago from September 1 until October 1, 2005, to study marine organisms and habitats. Log on daily to join a virtual exploration of the underwater world of the Northern Islands, as well as the more familiar southern neighbors. The website will feature photos, reports from the field, interviews with scientists and crew, and feature articles. Sign your class up as a "Classroom at Sea" and receive a free package of educational materials.
http://www.crm.gov.mp/maramp/

Virtual Whale Watch
Bring a whale to school. Landlocked pre-K-6 students in Mid-Atlantic states can participate in a simulated whale watch and activities to stimulate their interest in marine science and endangered species. The website features a Kid's Page with whale sounds, "Ask a Scientist," resources, and information appropriate for pre-K-6.
http://members.aol.com/passintime .

VirtualJobShaddow
VirtualJobShadow is an online career planning and career exploration resource that provides tools and resources for charting your career path. Check out the Esri- and NOAA-supported Climate Scientist profile. Additional demo profiles include Sustainability Architect, Mechanical Engineer, and Operating Room Nurse.
http://www.virtualjobshadow.com/

Vischeck
Vischeck offers a way of showing what things look like to someone who is color blind. You can try Vischeck online or download programs to run on your own computer. The website also offers Daltonize to allow for color blind image correction.
http://www.vischeck.com/vischeck/

Vision Fire Lessons Learned
A research publication on the 1995 Vision Fire has recently been completed. The fire burned more than 12,000 acres of federal, state, and private land in California, most within Point Reyes National Seashore. The downloadable publication documents lessons learned from the fire, including flora, fauna, and geomorphic response.
http://www.nps.gov/pore/fire_visionfire.htm

Visions of Undersea Alaska: 2005 Engagement Calendar
Alaska's pristine seas teem with life beyond imagination. With more than 50 colorful underwater photos, this calendar from Sea Grant provides an up-close look at Alaska's amazing sea life, ranging from tiny space-alien-like plankton to invertebrates, fish, marine mammals, and seaweeds. Photos were taken by scientists, scuba divers, and professional photographers in Southeast Alaska, the Aleutians, and other Alaska locations. Captions provide fascinating facts about each subject.
http://www.uaf.edu/seagrant/Pubs_Videos/pubs/SG-ED-45.html

Visit the Bridge at NMEA
As the NMEA annual conference draws near, July 23-27, 2007 in Portland, Maine, the Bridge educators are preparing some great new resources and activities to present. One presentation to look out for is "Lobster: The Price of Deliciousness," which will walk educators through a brand new Bridge DATA (Data Analysis Teaching Activity) that

explores Maine lobster catch data and evaluates fluctuations in price and landings. For those looking for a more physical oceanography-based session, look for "Ocean Observing Systems: What are they and how can I use 'em?" This session will give participants an overview of ocean observing and several strategies for integration into existing curricula.
http://www.marine-ed.org/bridge

Visiting Geoscientists: An Outreach Guide for Geoscience Professionals
This American Geological Institute guide is written to provide Earth science enrichment for students. The guide includes a discussion of what effective modern enrichment can be like, how K-12 students learn science best, a review of the current state of Earth science in K-12 education, Classroom Tips to provide ideas to help get into (and out of) the classroom, and how to make the most of the time spent there; and sample activities, material lists, and other resources.
http://www.agiweb.org/education/aapg/index.html

Visual Dictionary
The Visual Dictionary website offers annotated images that identify each part of a given item, such as a turtle or starfish. Visitors can search the site by using the embedded search engine, by list of topics, or by picture thumbnail. There is also a link to Wikipedia for more information on the topic, and a catalog of images. An image-share feature allows the use of an image on a webpage, and classroom use is allowed, subject to conditions.
http://www.infovisual.info/

Visual Ocean
Those interested in using ocean data in the classroom, or data visualization in general, should check out this community blog started by COSEE NOW. Visual Ocean explores how educators and scientists can use real-time data and data visualization. The blog is new, but topics already include streamflow and flooding, buoy data, coastal population, and more. Subscribe to keep up-to-date with new postings.
http://coseenow.net/visual-ocean/

Visualization Challenge Winners
The winners of the 2013 International Science and Engineering Visualization Challenge are posted on this NSF website. The contest honors scientists and artists who create thought-provoking videos and visuals that promote understanding of scientific research. Check out Invisible Coral Flows, EarthViewer, Dynamic Earth Visualization Excerpt, and more.
http://www.nsf.gov/news/special_reports/scivis/winners_2013.jsp

Visualizing Dock Growth
Permitting of residential docks and piers is a contentious issue in many coastal areas. The NOAA Coastal Services Center's new website, Visualizing Dock Growth, will help coastal communities better understand, visualize, and manage the cumulative impacts of dock and pier growth in waterways. The website features 3-D visualizations of various scenarios at a real-life study area, outreach materials, and more.
http://www.csc.noaa.gov/dock_growth/index.html

Vocalizations of Georgia's Frogs CD
Presenting the unique calls of all 31 species of Georgia's frogs, the Calls of the Wild CD is produced by the Georgia Department of Natural Resources, Wildlife Resources Division to introduce the wonderful and often bizarre calls of Georgia's frogs and toads. The CD has separate recordings of every native species. Narration is provided for each of the individual species' recordings, along with a 15-page booklet.
http://eeingeorgia.org/page.asp?itemid=13156

Voices of the Bay
Voices of the Bay is a place-based fisheries education program for students (grades 7-12 and community colleges) that encourages harbor field trips and fishermen oral interview activities by students. The downloadable curriculum focuses on California but can be adapted for other regions. The modules are Balance in the Bay, From Ocean to Table, and Capturing the Voices of the Bay.
http://sanctuaries.noaa.gov/education/voicesofthebay.html

Voices from the Fisheries Handbook
NOAA's Fisheries Service offers the website, Voices from the Fisheries, a central repository for consolidating, archiving, and disseminating oral history interviews related to commercial, recreational, and subsistence fishing in the U.S. and its territories. The downloadable book, *Voices from the Fisheries Handbook: Preserving Local Fisheries Knowledge, Linking Generations, and Improving Environmental Literacy*, provides a roadmap for designing and conducting oral history projects.
http://www.voices.nmfs.noaa.gov/

Voices in the Sea
The Whale Acoustics Lab at the Scripps Institute of Oceanography is continuing to support and update the Voices in the Sea website. Teaching resources include a student journal and grading rubric for each of the lessons, while the Kids Page offers interactive games. There are videos, interviews with experts, and a special edition section for IPY and commercial vs subsistence whaling.
http://cetus.ucsd.edu/voicesinthesea_org/Flash/

Volcanism and Landslides
Follow along with scientists on the JOIDES Resolution Expedition 340: Lesser Antilles Volcanism and Landslides, March 6-April 17, 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/2219

Volunteer Liability
The National Sea Grant Law Center at the University of Mississippi offers a downloadable Volunteer Liability pamphlet. This publication reviews volunteer liability laws nationally and state by state, and can help those that are planning and organizing efforts involving volunteers. The document offers an overview of the federal and state volunteer liability laws, as well as additional issues and doctrines that may apply to volunteer and volunteer organizers.
http://www.olemiss.edu/orgs/SGLC/National/Volunteer.pdf

Volunteer and Service Programs Resource Center
The Corporation for National and Community Service Resource Center offers the Resource Center website as an online "one-stop shop" for tools to strengthen volunteer and service programs. Quickly and easily find more than 2,500 free downloadable tools, e-courses, and other useful resources and materials on hundreds of topics of interest to nonprofit and volunteer leaders.
http://www.nationalserviceresources.org/

Voyage to Discovery
Voyage to Discovery, from NOAA's Office of National Marine Sanctuaries and partners, is a multimedia educational initiative highlighting African-American contributions to the country's maritime heritage, while fostering increased participation in marine careers and ocean conservation. Journey through time to discover stories of African-Americans and the sea through education, archaeology, science, and underwater exploration.
http://voyagetodiscovery.org/

Voyage of the Lonely Turtle
PBS/Nature aired the program, Voyage of the Lonely Turtle, based on one Loggerhead turtle's 9000 mile trip across the Pacific. The website offers information about turtle anatomy, navigation, a link to an interactive game, lesson plans, and more.
http://www.pbs.org/wnet/nature/turtles/index.html

Voyager for Kids
Scripps Voyager for Kids lets young people ask oceanographers questions about the Earth's seas and climate. Be sure to check out explorations now (small link in the top blue banner) for additional educational materials including Research Highlights, A Scientist's Life, and more.
https://scripps.ucsd.edu/explorations/voyager

Voyages! Titanic 2012
A cruise ship and an expedition ship will be at the wreck site of *Titanic* to commemorate the 100th anniversary of the ship's sinking. There will be a series of programs beginning April 9, 2012 aimed at grades 3-7 to be streamed into classrooms. In addition, related lesson plans will be available through the website for subscribing schools.
http://www.voyages-to-remember.com/

Waikiki Aquarium - August Programs
The Waikiki Aquarium, founded in 1904, is the third oldest public aquarium in the United States. A part of the University of Hawaii since 1919, the Aquarium is located next to a living reef on the Waikiki shoreline. Some of the outreach and education programs for August include a shark overnight, in which participants build their own sharks and race them across a tank; an afternoon investigating hermit crabs and their housemates through storytelling, art and up-close encounters;; and much more.
http://waquarium.otted.hawaii.edu/

Walden Media Educator Guides
Walden Media brings books to life on the movie screen and offers downloadable lesson plans you can use with your students. The lesson plans are interdisciplinary, written by educators for educators, and comply with national standards in content areas and in character education as well. Check out Ghosts of the Abyss (exploration of the

Titanic), the White Giraffe (wildlife, nature, and character motivation), and Nim's Island (ways to protect the ocean and how sanctuaries preserve these underwater treasures).
http://www.walden.com/walden/walden/guide_matrix.php

Wall of Wind
The 12-fan Wall of Wind at Florida International University is the largest and most powerful university research facility of its kind and is capable of simulating a Category 5 hurricane.
http://wow.fiu.edu/

Walt Disney's Sacred Planet
Walt Disney's new film, Sacred Planet has been released in IMAX theaters. Some of the film locations include old growth forests of British Columbia, underwater Borneo, New Zealand beaches. The images include the landscape, the people, and the animals indigenous to the land. There is also a downloadable Educator's Guide.
www.sacredplanet.com .

Wandering Wetland Travelling Trunk
The Wandering Wetland Travelling Trunk from Environmental Concern in St. Michaels, Maryland, contains artifacts and activities designed to introduce elementary students to wetland ecology. Filled with skulls, rubber track molds, numerous curricular resources, and more, the trunk provides teachers with materials for experiential learning and structured lessons about the environment. Included in each trunk is a free copy of the national curriculum guide WOW! The Wonders of Wetlands.
http://www.wetland.org/education_travelingtrunk.htm

Warming World
NASA's Warming World website hosts a series of articles, data visualizations, space-based imagery, and interactives that explore the recent winter weather that gripped the United States, Europe and Asia, and how El Nino and other longer-term ocean-atmosphere phenomena may affect global temperatures this year and in the future.
http://climate.nasa.gov/warmingworld/

Warning Signs for Dangerous Times
The New York Times offers this lesson plan, Warning Signs for Dangerous Times: Exploring the Use of Storm-Tracking Technologies, in which students explore the use of storm-tracking technologies, research how natural disasters are predicted, and assess the importance of these technologies. A case study of a New England snow storm and its impacts is presented for discussion, along with suggestions for retrieving information about forecasts.
http://learning.blogs.nytimes.com/2000/01/27/warning-signs-for-dangerous-times/

Washed Ashore
Washed Ashore is a project of The Artula Institute for Arts & Environmental Education, whose mission is to provide opportunities to express and teach environmental issues through the arts. The Washed Ashore Project creates awareness about marine debris and plastic pollution through large art sculptures and other materials. Upcoming exhibits will be at the Virginia Aquarium, SeaWorld Parks, and elsewhere.
http://washedashore.org/

Washing Away
Washing Away: Losing Louisiana will air nationally on TV on September 7, 2006 at 9:00 p.m. EST. This story of Louisiana's disappearing coastline and how this unfolding crisis affects all of America is told through the eyes of people affected by hurricanes Katrina and Rita. You can see a trailer of *Washing Away* and download lesson plans on the website.
http://www.lpb.org/programs/washingaway/

Washington State Department of Natural Resources: Geology & Earth Sciences
The Washington State Department of Natural Resources website offers how-to guides for the Geology and Earth Sciences. Topics include Geologic Hazards & Mapping, Earth Resources, and more. Publications include maps, reports, and more.
http://www.dnr.wa.gov/ResearchScience/GeologyEarthSciences/Pages/Home.aspx

Waste In Place Curriculum
Keep America Beautiful's educational resources for teachers and students includes this K-6 classroom curriculum supplement, *Waste in Place*, which helps build critical thinking, processing, and problem-solving skills through hands-on lessons that can be taught individually or in sequence.
https://secure2.convio.net/kab/site/SPageServer?pagename=waste_in_place&JServSessionIdr004=3meecn6tb3.app209b

Watchable Wildlife Program
The *Watchable Wildlife Program* is a cooperative, nationwide effort made up of state and federal agencies to support the public's interest in viewing wildlife and conserving wildlife habitat. NOAA Fisheries' Office of Protected Resources and the National Ocean Service's National Marine Sanctuary Program ensure that marine species and habitats are included in the program, and develop appropriate marine viewing guidelines.
jill.lewandowski@noaa.gov

Water Basics
The Water Basics website from Environment Canada includes the hydrologic cycle; rivers; lakes; snowfall; and measuring, storing, and controlling water. Check out the interesting Quick Facts along with the more detailed Water Sources.
http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=A6A15B0B-1

Water Cycle Game
NOAA's OR&R offers the Water Cycle Game which offers players the chance to role-play as a water molecule of water to gain a better understanding for the complexity of the movement of water. Participants identify the states of water, where pollutants can enter the water cycle, and more.
http://response.restoration.noaa.gov/watercyclegame

Water Education Posters
This U.S. Geological Survey series offers six educational posters, on Wetlands, Water Use, Wastewater, Navigation, Ground Water, and Water Quality. Each poster is available in two versions, one for elementary students and one for middle-school students.
http://water.usgs.gov/outreach/OutReach.html

Water-Energy Connection
EE Week offers numerous educational materials, including curricula, quizzes, and more. The Water-Energy Connection explores the interrelated use of water and energy in the U.S. and provides an opportunity to get students thinking about the interrelatedness of other ecological and environmental concerns. The website offers links to background information, videos, and more.
http://www.eeweek.org/water_and_energy_wise/connection

Water and Energy Use in California
Water and Energy Use in California is a new middle school curriculum produced by the California Department of Water Resources and is available for a free download. There is a student book and teacher guide, along with additional information and links.
http://www.owue.water.ca.gov/

Water Facts and Fun
The California Department of Water Resources offers water education materials at no charge. The materials are limited in quantity, so please review a sample copy before ordering classroom sets. Non-California residents may receive one free copy of each of the materials, sent to United States addresses only.
http://www.publicaffairs.water.ca.gov/education/catalog.cfm

Water Footprint
An individual's water footprint is equal to the water required to produce the goods and services consumed. Use this online calculator to determine your water footprint.
http://www.waterfootprint.org/?page=cal/WaterFootprintCalculator

Water for Life: UN Proclaims International Water Decade 2005-2015
At its 58th session, the United Nations General Assembly adopted a draft resolution proclaiming the period from 2005 to 2015 as the International Decade for Action, "Water for Life", starting on World Water Day, 22 Mar 2005. The goal of the Decade is "a greater focus on water-related issues, with emphasis on women as managers of water to help to achieve internationally agreed water-related goals".
http://www.unesco.org/water/ .

Water in Focus
Water in Focus is a global photography project that calls youth to action as they document the use, waste, conservation, and pollution of water through words and images. Students are invited to submit photos for the online virtual mural.
http://www.outsidethelens.org/wif.aspx

Water Information Center
The National Academies announces the launch of its Water Information Center, a portal with peer-reviewed reports on water-related issues, independent and objective consensus among experts from academia, industry, and others. The website's major topics: water supply and sanitation; water and soil remediation; hydrologic hazards; water quality in the natural environment; river basin systems management; environmental assessment, management, and restoration; and water science and research
http://water.nationalacademies.org

Water Issue Resources from Annenberg Media
With wildfires raging throughout California and drought affecting large areas of the southeast, check out these programs from Annenberg Media.

- *Water Resources*, Unit 8 of The Habitable Planet - The first case study in the program deals with dwindling water resources in the Southwest. Unit 5, Human Population Dynamics, explores the issue of population growth in areas where basic resources, such as water, are in short supply; http://learner.org/redirect/november/hab12.html
- *Water is for Fighting Over*, Program 7 of Human Geography: People, Places, and Change, deals with the fight over scarce water resources along the California-Nevada border; http://learner.org/redirect/november/hum13.html
- *Global Forces/Local Impact*, the eighth workshop of Teaching Geography - one of the case studies examines the conflict over water rights in Oregon; http://learner.org/redirect/november/tgeo14.html

Water Neutrality
This concept paper on "Water Neutrality" was produced by a small group from NGO, academic, and business backgrounds. It was conceived through a common interest in investigating whether neutrality can be (or become) a meaningful tool that helps water stakeholders in their efforts to achieve and promote good stewardship of this critical resource.
http://www.ramsar.org/forum/forum_wwf_water_neutrality2007.pdf

Water on the Web
Water on the Web helps high school and college students understand and solve real-world environmental problems using advanced technology. It is a package which contains two sets of curricula, data from lakes and rivers nationwide, online primers, data interpretation and Geographic Information System tools, and additional supporting materials.
http://waterontheweb.org/

Water Planet Challenge
EarthEcho's Water Planet Challenge provides information and materials to help middle and high school students take action to protect and restore our planet's natural resources while teaching to key standards. The Hot Topics presents monthly interviews, information, and lesson plans covering critical news stories. The current topic is In the Wake of the Fukushima Daiichi Accident – One Year Later. Check out the educator resources, action guides, and more.
http://www.waterplanetchallenge.org/wpc/

Water Quality Curriculum
This curriculum guide for grades 6-8 contains five activities that incorporate data from NOAA's National Estuarine Research Reserve System. Students learn how to access and interpret water quality data, and how to look for patterns and changes over time. The goal is for students to experience different kinds of data and data accessing tools, so that, by the end of the module, they can continue to explore data sets driven by their own inquiry.
http://apps.dataintheclassroom.org/water-quality/

Water Quality and Dissolved Oxygen<
This website from Science Junction features general information and three lesson plans about dissolved oxygen, geared toward middle and high school students. Lessons cover topics such as what dissolved oxygen is, why it is important, and more, including an activity in which students are instructed to design an experiment to test effects of changes in dissolved oxygen concentration.
http://www.ncsu.edu/sciencejunction/depot/experiments/water/lessons/do/

Water Resources of the Caribbean Countries & Territories
The CD *Water Resources of the Caribbean Countries & Territories* is now ready for distribution (for a nominal cost). The CD has information for 35 countries, islands and/or territories, including maps; size, population, climate, economy; water availability, supply, and demand; vulnerability of coastal aquifers; coastal zone issues; and legal setup and institutions.
jasminko.karanjac@uwimona.edu.jm .

Water Safety
The U.S. Army Corps of Engineers is the leading provider of outdoor recreation on all federally-managed public lands in the United States. With a recreation base that is primarily built around water, the Corps has a dedicated focus on water safety. The pages of the National Water Safety Program website let you view current water safety materials available through the Corps program, download *Safe Passage* program information, and more. The Water Safety Fun Book can be downloaded at http://www.lacoast.gov/education/kids/coloringbooks/watersafety/.
The National Water Safety Program homepage is at http://watersafety.usace.army.mil/.

Water Science for Schools
The U.S. Geological Survey's *Water Science for Schools* website offers a broad range of information about water. Topics include basic background information, a breakdown of water use in the U.S., a glossary of terms, and much more. The website includes activities, graphics, data tables and more.
http://ga.water.usgs.gov/edu/sitemap.html

Water Science for Schools
This site from the U.S. Geological Survey explores many aspects of water. This website includes pictures, data, maps, and an interactive center where you can test your water knowledge. A glossary and related links are also included.
http://ga.water.usgs.gov/edu/

Water Sourcebooks
The EPA offers the downloadable Water Sourcebooks, with activities for grades K-12 divided into four sections: K-2, 3-5, 5-8, and 9-12. Each section is divided into five chapters: Introduction to Water, Drinking Water and Wastewater Treatment, Surface Water Resources, Ground Water Resources, and Wetlands and Coastal Waters.
All activities contain hands-on investigations, fact sheets, reference materials, and a glossary of terms.
http://www.epa.gov/safewater/kids/wsb/

Water Use: Tragedy in the Owens River Valley
These high school lessons help students develop a better understanding of the importance of well-managed water use while exploring the concepts of a watershed,

land use, aquifers, and water engineering. The material focuses on the historical water use decision affecting the Owens River Valley in California. Materials lists, procedures, assessment recommendations, and extension ideas are provided.
http://www.pbs.org/weta/thewest/lesson_plans/lesson08.htm

Water Wonders
The Wisconsin Department of Natural Resources offers *Water Wonders,* environmental education for young kids (K-3) and their teachers. Topics include the water cycle, groundwater and water facts, and conservation tips. There are also word searches and quizzes.
http://www.dnr.state.wi.us/org/caer/ce/eek/earth/groundwater/index.htm

Water's Journey Everglades
This website offers a wealth of information about the history and contemporary situation in and around the Everglades. It helps users understand the complicated ecological history and operation of the Everglades, including the role that humans play in its transformation. The website includes interactive maps, management information, history, lesson plans and other educational resources, and links to other materials and further background information.
http://theevergladesstory.org/

Waterbird Population Estimates
This publication sets the global standard in presenting estimates of the numbers and trends of waterbird populations throughout the world. This fourth edition provides a comprehensive update on information last provided in 2002 and summarizes population data on 878 waterbird species. The data are downloadable in spreadsheet format.
http://www.wetlands.org/event.aspx?id=318e62d4-b171-4f99-b77f-fda289041f6a

Water-CAT
The Florida Water Resources Monitoring Catalog is a searchable database of Florida water monitoring activity that answers "who, what, where, when and why?" for water resource managers, researchers, and others. The website allows a search by a wide variety of variables, and an interactive map allows a geographical search.
http://water-cat.usf.edu/

WaterFest – California
The San Luis Obispo County is holding WaterFest 2007, May 5, 2007 in San Luis Obispo, California. There will be games, hands-on educational activities, a water challenge contest, and more.
http://www.special-places.org/ecm/News_and_Events/WaterFest/Home.html

WaterLife
The NOAA Games website offers *WaterLife: Where Rivers Meet the Sea*, an interactive online game about estuaries. Set in California's Elkhorn Slough National Estuarine Research Reserve, the game explains what an estuary is and describes diverse ecosystems in estuaries and the influence of tides on the ecosystems. The game also addresses restoration efforts, marine debris, and emphasizes personal responsibility in caring for the environment. Check out the accompanying Field Guide.
http://games.noaa.gov

WaterLife: Sea Turtles and the Quest to Nest
NOAA's National Ocean Service and Fisheries Service launched the second online educational game in the WaterLife series, *Sea Turtles and the Quest to Nest*. The web-based game encourages and explains loggerhead sea turtle conservation through a series of games and animations aimed at grade 4-7 students.
http://games.noaa.gov/seaturtle/welcome.html

WaterNews
WaterNews is a weekly on-line publication of the U.S. Environmental Protection Agency's Office of Water that announces publications, policies, and activities.
http://www.epa.gov/water/waternews/ .

Water's Edge: The Crisis of Rising Sea Levels
Reuters published a multi-part series on rising sea levels. The report is available for viewing on the website.
http://www.reuters.com/investigates/special-report/waters-edge-the-crisis-of-rising-sea-levels/

Watershed Academy Webcast Seminars
EPA's Watershed Academy sponsors free webcast seminars. Webcasts are typically conducted on a monthly basis. Archived versions available from the website include topics such as climate change, lakes, wetlands, outreach and education, and more.
http://www.epa.gov/watershedwebcasts/

Watershed Action: Educate the Public
The Center for Global Environmental Education website offers information for teachers, grades 6-12, to plan educational activities for students to protect and clean up watersheds. Projects include trash cleanup, stenciling storm drains, testing soil nutrients, composting, planting to prevent erosion, and water quality monitoring. Instructions are provided, and links to related information are provided for teachers and students.
http://cgee.hamline.edu/watershed/action/projects/public_ed.htm

Watershed Educational Resources
South Carolina's Coastal Waccamaw Stormwater Education Consortium hosts this website with links to watershed-themed presentations, lesson plans, and hands-on activities. Check out the River Game, A Fish's Wish, and more.
http://cwsec-sc.org/264/lessons-activities/

Watershed Handbook
EPA's Office of Water has published *Draft Handbook for Developing Watershed Plans to Restore and Protect Our Waters*, a guide to watershed management as a tool in developing and implementing watershed plans. The handbook is aimed toward communities, watershed groups, and local, state, tribal, and federal environmental agencies. The handbook is designed to take the user through each step of the watershed planning process, including monitoring, outreach, BMPs, and more. Comments should be addressed to watershedhandbook@epa.gov by June 30, 2006.
http://www.epa.gov/owow/nps/watershed_handbook/

Watershed Patch Project
The EPA's Watershed Patch Project teaches students what watersheds are and motivates them to get involved in local watershed protection activities. The booklet

includes step-by-step instructions for community-based watershed protection activities, including stream walks, monitoring projects, and stream cleanups. The project, with certificate awards, is modeled after a similar project with the Girl Scouts of the USA.
http://www.epa.gov/adopt/patch/certificates/

Watershed Wonders
The Algalita Marine Research Foundation website offers educational materials available for downloading along with other initiatives. *Watershed Wonders* is an educational video series exploring issues in marine conservation, watershed management, and plastic debris. The series includes standard-based activities and information about water and watersheds for middle and high school classrooms.
http://www.algalita.org/education.html

Watersheds: Connecting Weather to the Environment
This short course on the Meteorology Education and Training website offers knowledge and instructional materials to help participants understand watersheds as our environmental home and the relationship between the weather and the health and protection of the environment. The materials are aimed at meteorologists, but can be useful for all educators. Free registration is required.
https://www.meted.ucar.edu/training_module.php?id=218

WaterWatch
The United States Geological Survey offers WaterWatch, with a map of real-time streamflow on the homepage. The data is organized into seven percentile classes that draw on historical data to illustrate how the current streamflow activity compares to activity in the past. Using a series of drop-down menus on the top allows users to look for current flood and drought watches and also access historical maps and graphs that offer some perspective on monthly streamflow.
http://water.usgs.gov/waterwatch/

Waterways
The Smithsonian Institution has assembled this portal of resources that feature water related content from all of its museums. Links include artwork, exhibits, and other collection items from around the Smithsonian. Themes include Plants and Animals, Weather, and more. Addition links on the website include links federal jobs related to water, links to NOAA, EPA, and NPS resources, and much more.
http://my.si.edu/initiatives/waterways/waterways

WaterWorks!
WaterWorks! is a public education and outreach program implemented through the Middle Tennessee State University Center for Environmental Education and designed to promote clean water in Tennessee. The program offers a series of public service announcements promoting water quality through responsible individual action. Brochures, a Stream Saver awards program, and more. To obtain the materials or for more information, please check out the website or contact them at (615) 898-2660.
http://www.tennesseewaterworks.com/

Watery Ring of Life: Saving our Estuaries, a PBS Broadcast
The Teaching Learning Network has produced a documentary featuring four National Estuary Programs: Maryland Coastal Bays, Narragansett Bay, Mobile Bay, and Puget

Sound. The documentary presents information about estuaries, including their social and economic importance, and highlights steps the four estuaries are taking to protect and restore their valuable resources.
drvolk@erols.com

Wave that Shook the World
This website from PBS is based on the NOVA TV program which originally aired on March 29, 2005 and tells the story of the 2004 tsunami, featuring video footage and scientific analysis of the onrushing waves that spread for 3,000 miles around the Indian Ocean basin. The website offers interactive features, questions and answers, a downloadable teacher's guide, and more.
www.pbs.org/wgbh/nova/tsunami/

Wavebreaking News
NOAA's National Ocean Service (NOS) presents the fall edition of Wavebreaking News, a multimedia presentation of developments in NOS science and technology. Available in Quicktime or Windows Media for different connection speeds, this brief news report features the Hunt for the Alligator, Navigation Safety, and Dolphin Health Exams. Links to information and contacts allow in-depth research into these topics. And while you're on the website, check out the links to the NOS data explorer, publications, and other topics. http://oceanservice.noaa.gov/news/wbnews/welcome.html .

Waves, Wetlands, and Watersheds
Waves, Wetlands, and Watersheds is a classroom and community activity guide for teachers that addresses endangered species, marine debris, coastal geology, water use, and more. It is aligned to the California State Science Content Standards for grades 3-8, and includes Community Action lessons adaptable for all ages up to and beyond grade 12. The guide is available to California educators for free from the California Coastal Commission, or it can be downloaded as a PDF.
http://www.coastal.ca.gov/publiced/waves/waves1.html

Waves, Wetlands, and Watershed, and Coastal Bluffs
The California Coastal Commission presents *Waves, Wetlands, and Watersheds,* an activity guide that addresses issues such as endangered species, coastal geology, and water use. A four-page primer on *Coastal bluff erosion* further investigates coastal processes. A Marine, Coastal & Watershed Resource Directory contains information on organizations working on issues related to the coast, including educational resources.
www.coastforyou.com, click on "For Educators."

Wayfinders: A Pacific Odyssey
This website is the companion for a PBS film that features a community of Pacific Islanders as they build sailing canoes & follow the stars on a 2,000-mile voyage across the ocean. The site includes a wayfinder game, an essay on navigating "blind," an interview with a wayfinding expert, links to related websites, and more.
http://www.pbs.org/wayfinders/

Wayside Guide
The National Park Service's Wayside Exhibits – A guide to developing outdoor interpretive exhibits contains three main sections: The Wayside Medium: An Overview, Wayside Development, and Wayside Production. The online guide offers links to additional websites for more in-depth tools and information.

http://www.nps.gov/hfc/pdf/waysides/wayside-guide-first-edition.pdf

WCPA Best Practice Guidelines
The IUCN WCPA offers a variety of guidelines for protected area managers, available for download from their website. These include *Guidelines for applying Protected Area Management Categories, Sacred Natural Sites - Guidelines for Protected Area Managers; Evaluating Effectiveness - A Framework for Assessing Management Effectiveness of Protected Areas 2nd Edition, Sustainable Financing of Protected Areas,* and more.
http://www.iucn.org/about/union/commissions/wcpa/wcpa_resources/wcpa_bpg/index.cfm

Weather and Climate
This unit from Phil Medina, a Junior High School science teacher, introduces students to concepts of weather and climate. Topics include the structure of the atmosphere, the definitions of weather and climate, and temperature and how it is measured. There are also discussions of heat transfers, larger-scale weather systems, and much more. While on the website, be sure to check out the sections on weathering and earthquakes.
http://www.mrsciguy.com/weather.html

Weather and Climate Data at the National Climatic Data Center (NCDC)
The National Climatic Data Center operates the World Data Center-A for Meteorology, in Asheville, North Carolina, and the World Data Center for Paleoclimatology, in Boulder, Colorado. NCDC provides access to all of the on-line data at no cost to users with .k12.xx.us or .edu domains. Free products include, but are not limited to monthly weather data summaries for a range of sites, historical weather maps, hourly precipitation data for a range of sites, and more.
http://ols.ncdc.noaa.gov/phase3/freeaccess.html .
http://www.ncdc.noaa.gov/oa/ncdc.html .

Weather, Climate, and Energy
Hurricane season in the Atlantic is June 1-November 30, 2006. Scientists are predicting another difficult season. Annenberg Media offers online programs that can help your students better understand the forces that influence our weather
Weather - http://learner.org/redirect/june/weather32.html
Planet Earth Program 3, The Climate Puzzle -
http://learner.org/redirect/june/planet33.html
Science in Focus: Energy, Workshop 6, Energy and Systems -
http://learner.org/redirect/june/energy34.html

Weather Education
The National Weather Service's Office of Climate, Water, and Weather Services offers this Education page with a range of materials for educators and young people. The website includes links to lesson plans, satellite image collections, career information, and more. There are also links to other student websites, a glossary of weather terms, and more. Be sure to check out the classroom materials.
http://www.weather.gov/om/edures.shtml

Weather Interactive
Annenberg Learner offers the Weather Interactive, an online introduction to the "hows" and "whats" of weather, including the atmosphere, forecasting, and more. There is also

a list of links for more in-depth information. While on the website, check out the other interactives by grade level, discipline, and more.
http://www.learner.org/interactives/weather/

Weather Puzzle
These weather picture "Slyder" puzzles on The Space Place website are fun to try. Users can pick easy, medium, or hard levels of difficulty to challenge logical- and spatial-reasoning muscles and to reveal dramatic ground-and space-based images of Earth and space weather phenomena.
http://spaceplace.nasa.gov/en/kids/goes/slyder

Weather-Ready Nation
NOAA's Weather-Ready Nation is about building community resilience in the face of increasing vulnerability to extreme weather and water events. The initiative includes improvements in a wide range of areas to support management of the nation's water supply, understanding of climate-related risks, economic productivity, and healthy communities and ecosystems. Check out the resources available on the Be a Force of Nature webpage, Tools for the Public, and more.
http://www.nws.noaa.gov/com/weatherreadynation/

Weather Wiz Kids
Elementary and middle school educators can access kid-friendly information to explain different types of weather on the Weather Wiz Kids website. The website covers more than 25 weather topics, including rains and floods, climate, weather forecasting, and much more. In addition to background information and lesson plans, the website offers games, suggested activities, and more.
http://weatherwizkids.com/

WeatherFest
WeatherFest, January 29, 2006 in Atlanta, Georgia, is an interactive science and weather fair designed to promote the field of meteorology, oceanography, and related sciences to Atlanta and surrounding area families, students and teachers. WeatherFest will feature more than 50 science exhibits including hands-on experiments, educational information, career guides, and more. WeatherFest is part of the American Meteorological Society's 86th Annual Meeting.
http://www.ametsoc.org/meet/annual/weatherfest.html

Web Resources for Environmental Educators
The Web Resources for Environmental Educators from the U.S. Fish and Wildlife Service is a link from the National Conservation Training Center's Conservation Library home page. It has links to a variety of sites that are helpful for educators, including general environmental education links, education standards and terms, resources, and electronic field trips.
http://training.fws.gov/library/

Webbing the Islands
The aim of this website from the University of Tasmania is to provide to people with a passion for islands, especially teachers, students, and community workers, a range of exciting and interesting island studies, activities, and resources, and to offer this space online to share work on islands with others around the world. Each year, the website will

focus on one theme related to islands; this year that theme is Sense of Place. The website includes downloadable learning units.
http://www.webbingtheislands.com/index.html

Webcast.Berkeley
Berkeley offers a number of webcasts and podcasts of select courses and campus events on this website. Visitors can learn about each event in the information section, and for some, users have the option to download the audio portion of the event. The course section provides webcasts, and users can also download podcasts. The selection of courses includes lectures on wildlife ecology, natural resources and population, animal behavior, and more.
http://webcast.berkeley.edu/

Webcams in Marine Protected Areas
MPA NEWS, Vol. 8, No. 5 from November 2006 published *Bringing MPAs Online: The Use of Webcams for Education, Monitoring, and Other Purposes*, offering a discussion of the use of webcams in marine protected areas for education, monitoring, and other purposes. In offers min-case studies of some of the ongoing projects, successes, and problems associated with this technology.
http://depts.washington.edu/mpanews/issues.html#Nov%202006

WebGURU
The Web Guide to Research for Undergraduates (WebGURU) is an interactive web-based tool intended to assist undergraduates navigate the hurdles of an undergraduate research experience. Resources include information about scholarships and fellowships, research programs, and much more.
http://www.webguru.neu.edu/

WebRanger
The National Park Service's interactive Web Ranger program helps people learn about the national parks. Explore more than 220 national parks through fossils, check out the games and activities, and more. The National Park Service hosts an interactive WebRangers website for kids age 6 and up. They can earn achievement certificates by completing different activities and earning passwords. Along the way they learn about the Park Service, as well as different National Parks, cultural artifacts, wildlife, and more. The activity list includes Protect the Harbor, Turtle Hurdles, Water Quality, and more. This site is strictly for fun.
http://nps.gov/webrangers/

Websites for Kids and Teachers
Check out this list of cool websites for teachers and kids from Edutopia. Listed websites include Animal Diversity Web, NeoK12, Kubbu, Games for Change, and much more. Beware: there are plenty of websites you can play with for hours.
http://www.edutopia.org/blog/48-summer-websites-kids-teachers-keith-ferrell

Website Resources for Environmental Education
The National Conservation Training Center's Division of Education Outreach of the U.S. Fish and Wildlife Service has updated their list of Web Site Resources for Environmental Education. The document 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/DEO/resource.list.pdf

Weddell Seal Expedition
This website offers insights into a current 2009 Antarctica expedition studying the Weddell seal. The website offers general information, multimedia, and more.
http://antarctica.ucsc.edu/home.html

Weddell Seals in the Antarctica
Educator Alex Eilers will be posting journals for the Weddell Seal Team while they are in Antarctica, November and December 2012. Follow along and post questions through the PolarTREC website, and check out the links to archived journals.
http://www.polartrec.com/expeditions/weddell-seals-in-the-ross-sea

Weddell Seal Population Count Activity
Have your students help field scientists monitor the Weddell seal population in McMurdo Sound, Antarctica. Using satellite images, students count the seal population over time in several traditional haul-out locations. The website has an Overview, Background Information for Teachers, Seal Count Tutorial, and the source satellite images.
http://www.pgc.umn.edu/about/research/weddell

The Weekly Dive
One World One Ocean Foundation is a nonprofit organization using the power of film, television, and new media to help inspire people worldwide to protect and restore the health of the ocean. The Weekly Dive offers a review of weekly ocean news. In addition, the website will post one user-generated video each week.
http://www.oneworldoneocean.org/

Weird & Wonderful Wildlife Poster
The U.S. Fish & Wildlife Service offer this new endangered species poster, Weird & Wonderful Wildlife, aimed at kids and the young at heart, highlighting 14 species with odd-sounding names. The artist imagined what they might look like based on their names, and one side of the poster is a collage of fanciful illustrations; the other side features photos of the plants and animals, accompanied by a few fun facts. The poster is available for free.
http://www.fws.gov/endangered/kidsposter.html

WeirdFins
WeirdFins is a NOAA Fisheries Service website and weekly podcast about strange or bizarre creatures that inhabit the sea. Each podcast is only two minutes long and is packed with interesting information. The website also invites visitors that have heard of or seen a weird sea creature that they would like to see featured, to contact WeirdFins. The website includes a text of the podcast in addition to the audio. Note: some of the links may not work properly at the moment, but this website is worth looking at.
http://www.nmfs.noaa.gov/rss/podcasts/weirdfins/

West Indian Whistling Duck and Wetlands Conservation Project
The West Indian Whistling Duck and Wetlands Conservation Project works to reverse the decline of this endemic endangered duck, and to prevent the further loss and degradation of wetlands in the West Indies. Through the educational materials and workshops, local working groups have been working to raise awareness of and

appreciation for the value of local wetlands and their responsible use, while pointing out the consequences of species and wetland loss.
http://whistlingduck.org/

Western Hemisphere Migratory Species Initiative Pathway
The Western Hemisphere Migratory Species Initiative Pathway website offers a myriad of information and useful links for those interested in studying migratory species. The website links to projects, resources and date, stories from the field, lessons learned, funding sources, and more. It is available through the Rainforest Alliance and is offered in English and Spanish.
http://www.eco-index.org/migratory/

Western Pacific Regional Fishery Management Council Education Resources
The Western Pacific Regional Fishery Management Council is one of eight regional fishery management councils. Their Education Corner offers student activities, video episodes from *Fishing in Old Hawaii*, and much more. Use the search feature to find many useful resources, and check out the Media Center for downloadable posters, and the Library for additional items.
http://www.wpcouncil.org/education.html

Western Regional Climate Center
One of six regional climate centers in the United States, the Western Regional Climate Center is administered by the NOAA, and is overseen by the National Climatic Data Center. Covering the area from Colorado to the boundary of the continental U.S., and including Hawaii and Alaska, this website hosts historical climate information and current atmospheric observations and frequently updated forecasts. In addition to the scientific information, the site also has a number of educational pages.
http://www.wrcc.dri.edu/

Western Soundscape Archive
This aural database is housed at the University of Utah's J. Willard Marriott Library and features recordings contributed by state and federal agencies, conservation groups, and volunteers. The collection currently offers representative sounds from approximately 80% of the West's bird species and 90% of the region's frog and toad species. The website also has weekly podcasts and a number of thematic sound collections, including the Sounds of the Arctic National Wildlife Refuge. Check this one out.
http://westernsoundscape.org/

Western Waters Digital Library
The vast reserves of water within the Western United States have been the cause of both great excitement and concern. This digital library brings together a wide range of documents, including legal transcripts, water project records, video collections, and personal papers documenting the Columbia, Colorado, Platte, and Rio Grande river basins.
http://harvester.lib.utah.edu/wwdl/

WET in the City
WET in the City engages K-12 youth in hands-on activities that find creative ways to explore the science of water, its cultural context, and the complex issues surrounding its management and stewardship. The program is delivered at the local level, city by city,

and targets urban educators with relevant, localized water education through a network of city partners. Sample activities can be downloaded from the website.
http://www.wetcity.org/index.htm

WET in the City and Team WET Schools
WET (Water Education for Teachers) in the City, an urban environmental education program of the Council for Environmental Education, engages K-12 youth in hands-on activities that creatively explore the science of water, its cultural context, and complex issues surrounding its management and stewardship. Team WET Schools is a companion program to WET in the City, bringing urban water issues to the forefront of environmental education in school buildings.
http://www.wetcity.org/

Wetland 101 CD
The educators of Environmental Concern, Inc. have created an educational resource CD for primary school teachers to use as a supplement for their water related curriculum, helping teach students about the wonderful world of wetlands. The Wetland 101 PowerPoint presents the basics of wetland ecology, functions, and values in a kid-friendly format. The accompanying notes pages provide recommended extensions on each topic.
https://sslserver.com/wetland.org/shop/main_publications.shtml?id=pub88

Wetland Ecosystem Services
The Ramsar Convention on Wetlands offers a variety of downloadable publications and information packs that can be useful for studying wetlands. Wetland Ecosystem Services fact sheets are available, with topics such as Reservoirs of biodiversity, Wetland products, Cultural values, Climate change mitigation and adaptation, and more. The information is also available in French and Spanish.
http://www.ramsar.org/cda/en/ramsar-pubs-info-ecosystem-services/main/ramsar/1-30-103%5E24258_4000_0__

Wetland Plants of the Northeast
This downloadable list compiled by the Swamp School lists plants by their common and scientific names and identifies their wetland indicator status, useful for delineation.
http://swampschool.org/whitepapers/SwampSchoolRegion1PlantList.pdf

Wetland Plants of the Southeast
This downloadable list compiled by the Swamp School lists plants by their common and scientific names and identifies their wetland indicator status, useful for delineation.
http://swampschool.org/whitepapers/Wetland_Plant_Guide_Region_2.pdf

Wetland User's Guide
An Introduction and User's Guide to Wetland Restoration, Creation and Enhancement, produced by EPA and NOAA, introduces non-technical readers to the basics of wetland projects, including planning, implementing and monitoring, and provides other references. To request a free copy, key EPA843B03001 into the search engine.
http://www.epa.gov/ncepihom/index.htm

WetlandInfo
The Australian Department of Environment and Resource Management and partners offer the wetlands website, WetlandInfo Queensland. The website includes information

about wetland monitoring, science and research, education and communication, and more. Educational materials include the downloadable Wetlands Reef Beat, Exploring Wetlands web quest, and more. Ecosystems include wetlands, reef, mangroves, and more.
http://wetlandinfo.derm.qld.gov.au/wetlands/

Wetlands Documents
A variety of publications are available for downloading at the Wetlands International website, including *The Socio-Economics of Wetlands* and T*he 7th Directory of Wetlands of International Importance*.
http://www.wetlands.org/pubs&/nwdnloads.htm

Wetlands Ecology and Management Series
The Northwest Center for Sustainable Resources has released the new curriculum series, Wetlands Ecology and Management. The series includes 7 modules, which are available by downloading from the website, as a CD, and as hard copy.
http://www.ncsr.org/materials/WetlandsEcologyandManagementSeries.html

Wetlands and Hurricanes
This instructional guide from the Northwest Center for Sustainable Resources is designed to provide instructors with lecture materials and resources that examine the complex relationship between wetlands and hurricanes, using Hurricane Katrina as a case study. The module describes the vulnerability of the Gulf Coast to damage from hurricanes and the role that wetlands and barrier islands play in coastal protection. Check out the full Wetlands Ecology and Management series (see the note, above).
http://www.ncsr.org/materials/WetlandsandHurricanes.html

Wetlands International
Wetlands International, a non-governmental organization, promotes the conservation and wise use of wetlands on the global, regional, and national levels. The website offers a brief introduction to wetlands, publications, a newsletter, and information about projects around the world.
http://www.wetlands.org/

Wetlands on Wheels – Eastern Shore
Environmental Concern Inc. offers its new Mobile Classroom, available to cruise to a schoolyard, library, or event near you. The classroom includes 25 learning stations, offering hands on activities which teach students the importance of wetlands in a unique learning environment. The classroom travels to Eastern Shore schools in Maryland, Delaware, and Virginia.
http://www.wetland.org/wetlandsonwheels.htm

Wetlands & Wonder Video: Reconnecting Children with Nearby Nature
This 14-minute video was produced by the U.S. Environmental Protection Agency discusses the loss of wetlands and the effect that the loss of natural areas closest to us has on our connection to the natural world. The video includes streaming text for the hearing impaired.
http://www.epa.gov/owow/wetlands/education/wetlandsvideo/

Wetlands Training and Curricular Guides
POW! Planning of Wetlands guides educators through the creation, restoration or enhancement of a wetland on school grounds or within the community. *Wow! The Wonders of Wetlands* includes activities in lesson plan format, background information on wetlands, ideas for student action projects, and a wetlands resource guide. An online wetlands course covers basic wetland ecology, types, functions and management.
http://www.wetland.org/educa.htm

Wetlands are Wonderful Scavenger Hunts - Georgia
Reed Creek Park in Martinez, Georgia, will be holding a series of scavenger hunts in November and December. The events will be tailored for school-aged children but all are welcome to explore their neighborhood to learn about the plants and creatures that live in a wetland habitat.
http://www.eeingeorgia.org/net/calendar/details.aspx?s=57828.0.68.4863

WetlandsLIVE - Online
WetlandsLIVE: A Distance Learning Adventure features a series of free live webcasts. Wetlands around the world will be used to show the functions and ecology of wetlands and their importance to people and wildlife. May is American Wetlands Month – sign up for the first webcast, May 9, 2013. Be sure to check out the lesson plans.
http://wetlandslive.pwnet.org./

Wetpixel.com – Digital Imaging for Divers
Wetpixel is dedicated to providing the latest information on digital underwater photography and imaging, allowing photographers to stay current with the technology and techniques that are changing the way we view the underwater world. The website offers equipment reviews, photography news, a beginner forum, and more.
http://www.wetpixel.com/

WET-WASH Initiative for Coastal Sewage Contamination
Globally, sewage is the largest source of marine contamination by volume. To address this, the United Nations launched a new campaign to clean up the seas by ensuring that people have access to toilets and safe drinking water. The partnership combines the Wastewater Emission Targets initiative with the Water, Sanitation and Hygiene for all campaign. The WET-WASH website has downloadable resources, including a training manual and 10 keys for sustainable municipal wastewater management.
http://www.gpa.unep.org/pollute/sewage.htm .

Whale and Dolphin Species Guide
This website from Whale and Dolphin Conservation offers information about over 80 species of these mammals, including photos (where available), distribution maps, and more.
http://us.whales.org/species-guide

Whale Rider Family Guide
The award-winning New Zealand film, *The Whale Rider*, premiered July 24,2005 on PBS. *Whale Rider* re-interprets a 1,000-year-old legend about Paikea, the founder of the native New Zealand tribe *Ngati Konohi*, whose members believe their leader arrived in their village on the back of a whale after his canoe capsized. The family viewers guide is a collaboration to create a national outreach campaign and interactive web experience around *The Whale Rider*.

http://www.piccom.org/whalerider/home.html

Whale Song Project
You can help marine researchers understand what whales are saying. It's as simple as listening to a large song sound and finding a small one that matches it best.
http://whale.fm/

A Whale of a Story
Electronic Field Trips from Ball State University are interactive, multi-media educational resources, selecting hard-to access places, national parks, and species for their focus. *A Whale of a Story* is a collaboration between Ball State University, Aquatic Adventures, and Scripps Institution of Oceanography, following the migration of the eastern Pacific gray whale. Designed for 3-8 graders, the website offers games, webisodes, and more.
http://www.bsu.edu/eft/home/00front.htm

Whale Trackers
Whale Trackers is a series of documentary programs that explore the lives of whales, dolphins, and porpoises. The videographers join international scientists and conservationists on expedition to investigate species and the diverse habitats they depend on. They examine the threats the animals face with a focus on how we can make a difference through a better understanding of our oceans. The website offers educational materials, videos, a photo gallery, and more.
http://www.whaletrackers.com/

Whale Watch
Through May 31, 2008, the public is invited to embark on a whale watch adventure through the Aquarium of the Pacific's educational whale cruise, in Long Beach, California. Explore the nearby seas to seek out the gray whale, bottlenose dolphin, sea lion, and a host of migratory waterfowl. The ocean adventure includes an educational multimedia presentation by a marine naturalist as well as various hands-on learning activities for all ages. The cost includes aquarium admission.
http://www.aquariumofpacific.org/education/programdetails/whale_watch/

Whale Watch Weekend and Intertidal Life Festival
The National Park Service hosted the 21st Annual Whale Watch Weekend and Intertidal Life Festival at Cabrillo National Monument, January 19-20, 2008. Participants explored tidepools and observe sea anemones, sea hares, and more; witnessed the return migration of Pacific gray whales en route from Alaskan feeding waters to their Baja California breeding lagoons; and listened as authors, researchers, and educators discuss the latest information concerning Pacific gray whales and intertidal life.
http://www.nps.gov/cabr/

WhaleNet
Wheelock College's WhaleNet Interactive Education website focuses on whales and marine research. Visitors can track marine mammals in real-time or used archived data to research the movements of various species or genders of satellite tagged marine mammals and sea turtles. There is also a program following the track of Erden Eruc as he rows across the Pacific Ocean and circumnavigates the world using only human-powered transportation. A variety of educational units and resources are available.
http://whale.wheelock.edu/Welcome.html

WhaleNet Satellite Tagging Data
Follow along with a Gray Seal or Sea Lion through WhaleNet's Satellite Tagging, Data, Maps and Information web pages. The website offers data from over 170 data tags, along with activities, background information, and more.
http://whale.wheelock.edu/whalenet-stuff/stop_cover.html

Whaleopedia
Whaleopedia is a guide to all species of whales, dolphins, and porpoises, with videos, audio recordings, natural history information, and more.
http://whaleopedia.org/animalfund/

Whales of the Mediterranean Sea
Whales of the Mediterranean Sea, a five-part documentary film series, is now available for download and use by teachers, with subtitles in six languages. The documentaries were produced to raise awareness, address challenges, create opportunities, and offer potential solutions to the problems facing this semi-enclosed sea in one of the most populous regions in the world. All documentaries are accompanied by complimentary education materials.
http://www.whaletrackers.com/whales-mediterranean-sea/

Whales: Voices in the Sea
This website from the Scripps Institution of Oceanography at the University of California, San Diego offers information about whales using Flash graphics, video, and more. Listen to the audio files and view the spectrograms of calls of humpback, beaked, gray, right, sperm and blue whales. The graphics show whale range and short video features offer information about each of the whales, current research on their sounds, and conservation efforts. A major expansion of the website will be unveiled in May 2006.
http://voicesinthesea.org

Whaling History: Laura Jernegan, Girl on a Whaleship
In October 1868, 6-year old Laura Jernegan from Edgartown, Massachusetts set out on a three-year whaling voyage with her family and the ship's crew to the whaling grounds of the Pacific Ocean. Courtesy of the Martha's Vineyard Museum, her story lives on today through her journal, which has been digitized and placed online. The website includes maps, artifacts, background history of whaling, and much more.
http://www.girlonawhaleship.org/

What Bird
This online bird guide for identifying birds of North America offers users a visual search engine to identify birds, the ability to create your own bird field guides, and consult with experts. You can browse by location, body shape, size, color, and field marks.
http://www.whatbird.com/

What the Fish?
The Field Museum in Chicago, Illinois offers a series of Science Podcasts, with commentary on the museum's in-house research, exhibits, and more. What the Fish? was a biweekly podcast series with 26 episodes, covering topics surrounding the biodiversity of fishes, including discussions on their general biology, ecology, and evolution. You can still access the series archives from this website.
http://fieldmuseum.org/explore/science-podcasts

What If Scientific—Leave Only Bubbles
What If Scientific—Leave Only Bubbles provides innovative educational materials to supplement marine, earth, and environmental science curriculums. What If... offers materials for earth & space science curriculums, and Leave Only Bubbles hosts marine science curriculum supplies.
http://www.leaveonlybubbles.com/catalog/

What We Know (About Climate Change)
The What We Know initiative is dedicated to ensuring that the three "R's" of climate change are communicated to the public: Reality, Risk, and Response. The website offers background information, videos, and a downloadable scientific report.
http://whatweknow.aaas.org/

What Will Adaptation Cost?
The report, What Will Adaptation Cost? An Economic Framework for Coastal Community Infrastructure, provides a framework that community leaders and planners can use to make more economically informed decisions about adapting to sea level rise and storm flooding. The four-step framework can be used to perform an assessment of costs and benefits of different adaptation approaches across a community, or to focus in on select infrastructure. The report also discusses the expertise needed at each step.
http://www.csc.noaa.gov/digitalcoast/publications/adaptation

What's the Catch? Fishing Game
This online game allows players to captain their own vessel and experience the ups and downs of commercial fishing. Players participate through several rounds of the game, with each round representing a fishing season. They try out different management approaches such as no-take areas, catch limits, trip limits, Territorial Use Rights for Fishing (TURFs) and catch shares.
http://catchshares.edf.org/catch-share-basics/whats-catch-interactive-game

What's an Estuary, Now You Know
The Association of National Estuary Programs, in partnership with the National Estuarine Research Reserves, launched the *What's An Estuary? Now You Know* campaign to make the word "estuary" a household word by 2005. A multimedia presentation is available for viewing and downloading from the website. In 2004, the campaign will launch a media campaign featuring television, radio, and print ads.
www.whatsanestuary.com

What's an Estuary? Now You Know CD-ROMs Available
4900 copies of the Association for National Estuary Program's *What's an Estuary? Now You Know* CD-ROMs are available to order from the US EPA's National Service Center for Environmental Publications. There will be a limit of 25 CDs per order, though requests for larger quantities will be considered for special events or estuary education and outreach needs.
http://www.epa.gov/ncepihom/ .

What's in your Watershed?
In the Bridge DATA, *What's in your Watershed?*, students will learn what a watershed is and how it is affected by all its residents, no matter how distant they are from the primary waterway. Students explore Chesapeake Bay Program data to evaluate land use and

riparian buffer statistics, along with water quality data from the Bay's various ocean observing systems.
http://www.marine-ed.org/bridge/index_archive0203.html

What's New in the New Year?
Stay current by joining Scuttlebutt, the Bridge website's marine science education email discussion list. This no cost, international listserv provides a forum for educators and scientists to informally discuss marine education ideas, issues, and questions, and allows ocean science programs from across the globe to advertise summer and year-round opportunities for educators and students, as well as countless new classroom resources.
http://www2.vims.edu/bridge/search/scuttle.cfm
http://www.marine-ed.org/bridge

What's the Scuttlebutt?
With over 2200 subscribers in 20 countries, the Bridge's free email discussion list, Scuttlebutt, serves as the most direct route for sending and receiving the latest ocean science education information. Scuttlebutt provides a forum for educators and scientists to informally discuss marine education ideas, issues, and questions; highlights new classroom resources; and allows ocean science programs from across the globe to advertise summer and year-round opportunities for educators and students. In addition to monitoring the list, Bridge staff also assists in locating experts to answer posted questions when needed.
http://www2.vims.edu/bridge/search/scuttle.cfm
http://www.marine-ed.org/bridge

Wheels of Time and Place
Wheels of Time and Place is a set of blank circular journals that can be used to explore the details of a place, cycles of day and night, passing of the seasons, or other phenomenon. The website offers a gallery of examples, resources, and more.
http://partnersinplace.com/wheels-of-time-and-place/

Where on Earth?
Embark upon a geographical adventure with NASA Jet Propulsion Laboratory's Multi-angle Imaging SpectroRadiometer (MISR) Mystery Image Quizzes. These puzzles are designed to inspire understanding of the physical, biological, and human processes that influence our home planet and cover topics from archaeology to zoology. Several available resources for discovering and revealing the meaning of image features help new geographical detectives to solve the challenging quiz questions.
http://www-misr.jpl.nasa.gov/education/whereonearth.html

Where Words Touch the Earth
In this new digital media collection for grades 3-12, students from American Indian Tribal Colleges interview Elders, students, and community members to provide a Native American perspective on climate change and its effects on their communities. Downloadable videos touch on key environmental science issues and indigenous knowledge of the depleted salmon population in Washington State, the ecological function and spiritual role of wetlands, and the relationship between humans and nature.
http://www.teachersdomain.org/special/nasawords/

Where in the World? Ocean Observations
The Office of National Marine Sanctuaries offers this website with data about the whereabouts and track of four research vessels, R/V *Auk*, *Fulmar*, *Manta*, and *Shearwater*. The website also includes water quality data collected during operations. Check out the current data from R/V *Manta*, the research vessel for Flower Garden Banks National Marine Sanctuary.
http://www.ncddc.noaa.gov/website/google_maps/PaCOOS/mapsPaCOOS.htm

Whistle Like a Bird
The Whistle Like a Bird Contest is one of a series of activities organized by Dominica's Forestry, Wildlife and Parks Division for the observance of the Caribbean Endemic Birds Festival, an initiative of the Society for the Conservation and Study of Caribbean Birds, and runs from Earth Day (April 22) to World Biodiversity Day (May 22) each year. Check this cool idea out through the YouTube video.
http://www.youtube.com/watch?v=LbxxoWStwLg

White House Climate Education and Literacy Initiative
The White House Office of Science & Technology Policy launched a new Climate Education and Literacy Initiative that will help connect American students and citizens with science-based information about climate change. Read the fact sheet about the initiative and check back for progress on the initiative.
http://www.whitehouse.gov/sites/default/files/microsites/ostp/climateed-dec-3-2014.pdf

WHOI Resources/Materials for Teachers
This website from the Woods Hole Oceanographic Institution offers a range of educational materials for teachers. The materials are divided into six areas including Information Packets, Citizen Science Projects, and more.
http://www.whoi.edu/page.do?pid=9538

Whooping Cranes Migration
This educational website was developed through a partnership of Annenberg/CPB, Journey North, and the Whooping Crane Eastern Partnership. This site connects to an extensive selection of lessons, activities and information, facts about Whooping Cranes in question/answer format, and background information about the Whooping Crane Reintroduction Study. Users can also connect to highlights from the Year 3 Reintroduction and Migration including maps, video clips, and photos
http://www.learner.org/jnorth/fall2003/crane/index.html .

Why Do We Explore?
The NOAA Office of Ocean Exploration and Research announces the first module of the Okeanos Explorer Education Materials Collection. The collection is being developed to encourage educators, students, and citizen scientists to become personally involved with the voyages and discoveries of America's first Federal ship dedicated to Ocean Exploration. Materials include a Leader's Guide for Classroom Explorers, background information, links to resources, and an overview of recommended lesson plans.
http://oceanexplorer.noaa.gov/okeanos/edu/welcome.html

The Why Files
Science touches our lives in countless ways. Yet people often think science is relevant only to a white-coated, lab-dwelling elite. The Why Files portray science as a critical human endeavor conducted by ordinary people. They use news and current events as

springboards to explore science, health, environment, and technology, with plenty of focus on the ocean. Their real-life approach to science writing, and correlation to science teaching standards, can help you bring the news and science into the classroom.
http://whyfiles.org/index.html .

Why Is the Ocean Salty?
This webpage offers a primer explaining the origin of the ocean, sources of salts, and processes affecting its chemical composition, including the hydrologic cycle.
http://www.palomar.edu/oceanography/salty_ocean.htm

WhyReef
WhyReef is a virtual coral reef, and participants can gain knowledge in reef biology and ecology. Students become coral reef scientists and keep track of fish, coral, turtles, and other reef creatures.
http://www.whyville.net/smmk/top/gates?source=reef

WIDECAST – Sea Turtle Resources
WIDECAST is an expert network of biologists, managers, community leaders, and educators in more than 40 nations and territories, committed to an integrated, regional capacity that ensures the recovery and sustainable management of depleted sea turtle populations. The website hosts myriad resources, from basic biology of Caribbean Sea Turtles to educators' guides to ecotourism guides to marine turtle trauma response procedures.
http://www.widecast.org/

Wider Caribbean Sea Turtle Conservation Network
The Wider Caribbean Sea Turtle Conservation Network (WIDECAST) is an international scientific network comprised of volunteer Country Coordinators (mainly sea turtle experts, natural resource professionals, and community-based conservationists), an international Board of Scientific Advisors, and Partner Organizations in more than 30 Caribbean States and territories. The program offers an educator's handbook and a teacher's activity manual to help teachers bring the study of sea turtles into classrooms. Contact Karen Eckert at keckert@widecast.org

WikiEducator
The Commonwealth of Learning is an intergovernmental organization created by Commonwealth Heads of Government, Canada, to encourage the development and sharing of open learning and distance education knowledge, resources, and technologies. They support WikiEducator, an online community resource for the development of free educational content. Check out the Virtual University for Small States links (VUSSC Node).
http://www.wikieducator.org/Main_Page

Wild Alaska in the Classroom
The Alaska Wilderness League provides free resources teachers can use to work the Arctic and the Arctic National Wildlife Refuge into their lesson plans. The website features a variety of lessons and activities which cover components of the arctic ecosystem, including migration, bird identification, and animal adaptations. Materials include games, art, lessons, and much more.
http://www.alaskawild.org/take-action/educate/

Wild Classroom and Explore Biodiversity
This non-profit organization from Washington offers Explore Biodiversity, founded as an educator's resource, and The Wild Classroom, an outreach portal, to provide teachers with quality videos for use in their classrooms. The websites include video podcasts on a wide range of subjects.
http://www.explorebiodiversity.com/main/videopodcast.html
http://www.thewildclassroom.com/

Wild Life Employment Resources
As part of a blog, several students have compiled a list of employment resources to help students and young professionals find employment in the realm of conservation.
http://futureofconservation.blogspot.com/p/employment-resources.html

Wild Oceans
The IMAX film, *Wild Oceans*, follows the struggle for sea life off the coast of South Africa. A downloadable teacher's guide is available.
http://wildoceanfilm.com/admin/mod_documents/view_file.php?id=5

Wild Republic's Learning Adventure
Wild Republic's Learning Adventure features lesson plans about nature, animals and their habitat. The 2004-2005 lesson plans are provided by Audubon Adventures and include marine mammals, animal talk, ponds, and more. There is also a special purchase program for discounted plush animals, including water birds and birds of prey.
http://www.wildrepublic.com/lessonplans/2004/index.html

Wild Things 2003 - Habitat is Home Sweet Home
The U.S. Fish and Wildlife Service and its partners sponsor a *Wild Things* Electronic Field Trip yearly. This year they broadcasted a free, live, interactive satellite learning adventure geared towards Grades 5-7. *Wild Things* helps students and teachers explore and learn about National Wildlife Refuges and the fascinating critters that inhabit them.
www.nationalgeographic.com/geographyaction, http://www.wildthingsfws.org/

Wilderness Curriculum
The Wilderness Education Training Manual Series from the Arthur Carhart National Wilderness Training Center offers educators free curriculum, overheads, and other materials. The Wilderness and Land Ethic Curriculum is available for K-8 and 9-12.
http://carhart.wilderness.net/index.cfm?fuse=curriculum

Wilderness Stewardship and Science
The National Park Service's *Park Science* offers a special issue on Cultural Resources Management in Wilderness Areas in the Winter 2011-2012. Articles examine cultural resources stewardship and contributions to the monitoring and assessment framework for wilderness character.
http://nature.nps.gov/parkscience/

WildFinder
The World Wildlife Fund has created the WildFinder database, which allows users to find out where various species live around the world. The information in the database is based on 825 ecoregions and currently includes information for four large taxa: birds, reptiles, mammals, and amphibians. Visitors can search by country, U.S. ZIP code, or

city; search by species name; and also view a map gallery that contains some pre-selected themes.
http://www.worldwildlife.org/wildfinder/

Wildfowl and Wetlands Trust Education Website
The Wildfowl and Wetlands Trust presents WWTlearn – Learn from the world's wetlands. This education site includes downloadable lesson plans, data sets, background materials and images about water, wetlands and wetland life. Designed to the English National Curriculum, it is adaptable to U.S. standards. There is also a quarterly e-newsletter.
http://www.wwtlearn.org.uk/index0.html

Wildland Fire Lessons Learned Center
The purpose of this website is to improve safe work performance through organizational learning in interagency wildland fire. The website offers resource documents, newsletters, lessons learned, and more.
http://www.wildfirelessons.net/Home.aspx

Wildlife Heroes
Wildlife Heroes provides a visual and written window into the world of those people working in the remote corners of the Earth to save animals, the fascinating species, and the issues that must be resolved to save them. Heroes from Oceana, WideCAST, Project Seahorse, the National Marine Sanctuary Foundation, and other ocean-related organizations are included.
http://www.wildlifeheroes.org/

Wildlife and Whale Cruises
The Aquarium of the Pacific invites the public on whale watch cruises through their educational "Wildlife and Whale Cruise," Saturdays and Sundays in February and March, 2006. Cruises include an educational multimedia presentation by a marine naturalist as they search for migrating animals along with hands-on learning activities for children of all ages, including *Whale Biofact Discovery* and the *Plankton Tow.*
http://www.aquariumofpacific.org/EDUCATION/OUTDOOR/whale.htm

Wildlife Forever
The mission of Wildlife Forever is to conserve America's wildlife heritage through conservation education, preservation of habitat and management of fish and wildlife. The Wildlife Forever CD-ROM Curriculum is a conservation education supplement that teaches students about a variety of wildlife species, natural resources, ecological concepts, and conservation. The curriculum includes 14 lesson plans designed to cultivate a feeling of personal responsibility for the wonders of nature.
http://www.wildlifeforever.org/

Wildlife-Friendly Yard Program
The AZA is spearheading a wildlife-friendly yard program. This new program will focus attention on some important issues surrounding the health of our waterways and provide people with a tangible way to take action. By encouraging people of all ages to help make their own yards friendlier for wildlife, habitats "downstream" from these lawns will be healthier for animals like otters, salmon, whales, manatees, and catfish. For additional information about how your organization can participate in this project, contact Dot Siegfried at dsiegfried@aza.org, or call (301) 562-0777, ext. 254.

http://www.riverbanks.org/s04education/wildlifefriendly.shtml

Wildlife Refuge Coloring Books, English and Spanish
The Refuges Washington Office has a few hundred coloring books designed for grades 2-3 which describe the National Wildlife Refuge System. The coloring books are available for free, as long as supplies last. Send your mailing address - no P.O. Box addresses – and phone number to Martha Nudel and tell her how many you would like. Both English and Spanish versions are available, so please specify.
Contact Martha at Martha_Nudel@fws.gov

Wilkes Land Expedition Videos
Check out the videos from the *Joides Resolution* expeditions through Penguin TV, PEAT News Network, and more at this website. Each video update includes an interview with a scientist aboard the 470' *JOIDES Resolution* during a seafloor coring expedition off the Antarctic coast earlier this year. The videos tie paleoclimate research to modern climate change discussions and allow students to get an idea of what it's like to live and work at sea, with a little comic relief thrown in.
http://joidesresolution.org/node/52

Wilkes Land Glacial History
The *JOIDES Resolution* scientific ocean drilling vessel has left New Zealand and is heading to the coast of Antarctica on an expedition centered on climate change questions. Students, teachers, and the public can follow the expedition through ship scientists and staff blogs, videos, Ask the Scientist opportunities, and more.
http://joidesresolution.org/

Wind Map
The wind map is a personal art project, not associated with any company. While the data comes from the National Digital Forecast Database and is revised once per hour, there are no guarantees about the correctness of the data or the software. It is, however, a beautiful and interesting use of available data.
http://hint.fm/wind/?utm_source=NHC+Master+List&utm_campaign=07725af25f-DR_585&utm_medium=email

Window in the Waves
Window in the Waves is the story of the Flower Garden Banks, a documentary of Synergy Productions in association with Louisiana Public Broadcasting. If your public broadcast channel doesn't host a showing, you can view it on the LPB website.
http://beta.lpb.org/index.php?/site/programs2/window_in_the_waves/window_in_the_waves

Windows to the Universe
Windows to the Universe is a website covering earth and space sciences for use by the general public. It includes documents, animations, data sets, and much more, exploring the historical and cultural ties between science, exploration, and the human experience. The site is written in three reading levels approximating elementary, middle school, and high school reading levels. Topics include the hydrosphere, climate and global change, and more.
www.windows.ucar.edu/cgi-bin/tour_def/earth/earth.html

Windows to the Universe Website Update
Windows to the Universe has moved to a new home with the National Earth Science Teachers Association, offering new capabilities and opportunities for partnership. The shift is designed to help make the site an open educational resource and to allow scientists, university faculty, K-12 educators, and others to contribute content more readily in support of the geoscience education community. The website offers Earth and space science content, professional development, and much more.
http://windows2universe.org/

Winged Ambassadors
NOAA's Cordell Bank National Marine Sanctuary and partners offer Winged Ambassadors – Ocean Literacy through the Eyes of Albatross, a free, online, five-unit activity package. These lessons use inquiry-based science instruction aligned to standards for grades 6–8, with extensions for grades 9-12. Each unit includes a lesson plan, worksheets and handouts, presentations, and more.
http://www.downloadwingedambassadors.org/

Winged Ambassadors: Ocean Literacy Through the Eyes of Albatross
Winged Ambassadors is a set of five lessons that use data from current research tracking albatross migrations and ocean plastic pollution. The lessons use inquiry based science instruction, aligned to standards for grades 6-8 with extensions for grades 9-12.
http://www.downloadwingedambassadors.org/

Winged Warnings
Created by Environmental Health News in partnership with National Geographic, Winged Warnings explores our changing environment through birds and bird health.
http://www.environmentalhealthnews.org/ehs/news/2014/aug/wingedwarnings1summary

Wings of Life Educator's Guide
Disneynature's Wings of Life looks at butterflies, hummingbirds, bees, bats, and flowers. The educator's guide is meant to be used with the Wings of Life film and includes four lessons targeting grades 2-4, focusing on pollinators and how technology can be used to study nature. The website also offers several short video clips.
http://nature.disney.com/wings-of-life/educators-guide

Wings Over Water Festival
Wings Over Water, on North Carolina's Outer Banks, celebrates the wildlife and wildlands in eastern North Carolina, drawing visitors from all over the country to experience the unique landscape, dunes, marshes, and inland forests of the Outer Banks while participating in birding, natural history, outdoor recreation, and paddling programs. The festival is a partnership between the Fish and Wildlife Service, the National Park Service, the Outer Banks Chamber of Commerce, and more.
www.wingsoverwater.org

Wings of Slumber
The Banana Slug String Band offered a free download of a wonderful collection of lullabies from their digital album, Wings of Slumber. Check this out when your day is just not going right.
http://bananaslugs.bandcamp.com/album/wings-of-slumber

Winter Wonderland
The Bridge features a series of Data Analysis Teaching Activities (DATA) that can be used to supplement curriculum material with timely and seasonal resources. Winter Wonderland focuses on how snow is formed and explores the idea that no two snowflakes are the same. The activity also discusses the water cycle and how water in the ocean can become snow in the mountains. Students will evaluate archived snowfall data and forecast snowfall at home and at the 2006 Olympic Games.
http://www.marine-ed.org/bridge/index_archive0102.html

Wisconsin Shipwrecks
Explore Wisconsin's Great Lakes shipwrecks through underwater video, historic photographs, and archaeological discoveries on this updated website. Explore 760 Lakes Superior and Michigan shipwrecks with information about the ships' construction, service history, photos, and more. Learn about underwater archeology, the value of studying shipwrecks, and much more.
http://www.wisconsinshipwrecks.org/

Wisconsin's Great Lakes Shipwrecks
This website includes underwater videos and photos of shipwrecks in Lakes Superior and Michigan, information on individual vessels, a map of the shipwrecks, a searchable database, and much more. Check out the Explorer's Tools for educational materials, video and more.
http://www.wisconsinshipwrecks.org

Wisconsin's Maritime Trails
The Wisconsin Historical Society established the Maritime Trails program to foster wider public appreciation of the state's rich maritime past and encourage preservation of unique historic sites such as shipwrecks, lighthouses, and historic waterfronts. The website offers introductory information, a searchable shipwreck database, a Diver Depth Game, and more.
http://www.maritimetrails.org/index.php

Women Exploring the Oceans
This website introduces the careers of several women in oceanography. Each woman has followed a different path and offers unique insights about her profession. Careers range from research scientists and professors to technical and support crew.
http://www.womenoceanographers.org/

Women in STEM
Check out these websites for focus pages on women in the sciences.
http://energy.gov/articles/new-energygov-video-series-highlights-women-stem-fields
http://free.ed.gov/?p=160
http://forgirlsinscience.org/women-in-stem/
http://www.whitehouse.gov/administration/eop/ostp/women
http://steminist.com/

Women in STEM Radio Stories
This radio series from WAMC, Northeast Public Radio, offers a look into efforts to increase the role of women in the STEM fields. Listeners can learn about programs and practices throughout the U.S. designed to broaden the participation of women in STEM.

http://www.womeninscience.org/index.php

Wonderful World of Weather
This standards-based Real Time Data Module for elementary students, developed by the Center for Improved Engineering and Science Education (CIESE) at the Stevens Institute of Technology, allows students to investigate weather phenomena locally and in other places around the world. By using hands-on activities and real-time data investigations, the students develop an understanding of how weather can be described in measurable quantities, such as temperature, wind and precipitation.
http://www.k12science.org/curriculum/weatherproj/index_NEW.html .

Wonderopolis
This National Center for Family Literacy website celebrates curiosity in our daily lives through short, thought-provoking "Wonders of the Day." Each Wonder presents a question, an image or video clip, an answer, and a Try it out! section with simple related activities. Categories include ocean, science, and many more.
http://wonderopolis.org/

Wonders of the Ocean
Feeding Minds, Fighting Hunger offers a Fisheries & Aquaculture module for students ages 8-12, helping them to understand the importance of ocean conservation and responsible fishing. The lessons address six themes through an interdisciplinary approach: the richness of the oceans; creatures inhabiting the oceans; food from the oceans; people who depend on the oceans; bad and good practices and their impacts on the oceans; and the importance of acting responsibly regarding the oceans.
http://www.feedingminds.org/fmfh/fisheries-aquaculture/wonders-of-the-oceans/en

Wonders of Water – American Zoo and Aquarium Association National Awareness Campaign
American Zoo and Aquarium Association (AZA) members are providers of animal care, conservation, and public education about wildlife, providing the highest standard of animal care while offering enjoyable educational experiences for families. This year, AZA zoos and aquariums embark on a public education campaign, *Wonders of Water,* to let the world know that everyone can make a real difference to help animals and our planet. It focuses on water-themed educational messages and family fun.
www.azasweb.com

Wordle
Wordle visitors provide text, and the free online application will generate word clouds, giving greater prominence to words that appear more frequently. Users can tweak the clouds with different fonts, layouts, and color schemes. You can spend lots of playtime on this website.
http://www.wordle.net/

Worksheet Library
This website features printable worksheets for teachers of grades K-6. The worksheets are aligned to National Standards and can be searched by grade level, subject, or standards. Some worksheets are free for downloading; others are available to members.
http://www.worksheetlibrary.com/

World Atlas of Panoramic Aerial Images
Created by Dr. William A. Bowen, these panoramas look like photographs, but are mathematical simulations created from satellite data that have been interpreted by computer calculations.
http://geogdata.csun.edu/world_atlas/

World Atlas of Seagrasses
UNEP/World Conservation Monitoring Center released the World Atlas of Seagrasses. The Atlas is the first book to summarize the global status of seagrasses. The book is a collaboration of leading experts in the field.
http://www.unep-wcmc.org/marine/seagrassatlas/

World of Change
Inspired by their 10th anniversary, NASA's Earth Observatory has pulled together a special series of satellite images documenting how the world has changed during the previous decade. Images are include Amazonian deforestation, evaporation of the Aral Sea, Arctic and Antarctic sea ice, and more.
http://earthobservatory.nasa.gov/Features/WorldOfChange/

World Conservation Monitoring Center Interactive Map Service (IMAPS)
UNEP-WCMC has been pioneering the delivery of interactive map-based conservation data on the Internet. Current GIS data sets that UNEP-WCMC maintain include Coral reefs, Seagrasses, Mangroves, and Protected Areas. The web GIS maps are easy to use and offer a basis for scientific inquiry and exploration in the classroom.
http://www.unep-wcmc.org/index.html?http://www.unepwcmc.org/reception/ims.htm~main .

World Conservation Monitoring Center Publications and Information
The United Nations Environment Program – World Conservation Monitoring Center maintains a large number of reports on different aspects of the environment, including biodiversity, ecosystems, and climate change. The website has a list of reports, many downloadable.
http://www.unep-wcmc.org/index.html

World Database on Marine Protected Areas
The World Database on Marine Protected Areas (WDPA-Marine) is dedicated to providing the most comprehensive set of marine protected areas data available. This website allows users to view information on marine protected areas in their web browser, to visualize them in Google Earth, to download data, and more.
http://www.wdpa-marine.org/

World Database on Protected Areas
The newly redeveloped World Database on Protected Areas includes features to increase access to maps, spatial files, metadata, and other information on the world's terrestrial and marine protected areas, including viewing in Google Earth or downloading data in various formats. Additional features aid the updating of data and quality control. It incorporates The MPA Global Database, created as part of the *Sea Around Us Project* at the University of British Columbia.
http://www.wdpa.org/

World Database on the Protected Areas of the World
The World Database on Protected Areas (WDPA) Consortium website contains information about the 2004 World Database on the Protected Areas of the World, a CD-ROM product. It was part of the WDPA Consortium efforts to share conservation information for the Fifth World Parks Congress. The Consortium welcomes contributions to the database by experts on protected areas.
http://www.biodiversity.org/wcpa/ev.php?URL_ID=1697&URL_DO=DO_TOPIC&URL_SECTION=201&reload=1099533914 .

World Ecosystems Beyond Borders
World Ecosystems Beyond Borders engages students in a dynamic study of local and global environmental issues. The units compare issues faced by Wisconsin communities and communities abroad. Each unit contains background information, activities, and a list of additional resources. The materials were prepared with a middle school audience in mind and can be easily adapted and used in the high school classroom. Topics include aquifer depletion, dams, and more.
http://global.wisc.edu/outreach/k-12/webb/

World Environment Day
World Environment Day, commemorated each year on June 5, is a principal vehicle through which the United Nations stimulates worldwide awareness of the environment and enhances political attention and action. This year's theme is *Wanted! Seas and Oceans – Dead or Alive?,* and the host nation will be Spain. A down-loadable poster is available in six languages. Learn more about this year's theme, *Many Species. One Planet. One Future*, download posters, and more. 2012: *Green Economy: Does it include you?*, *Raise your voice, not the sea level*.
http://www.unep.org/wed/2010/english/theme.asp
http://www.unep.org/wed/2004/ .
http://www.unep.org/wed/

World Fisheries Day
November 21, 2014 is World Fisheries Day.
https://www.facebook.com/pages/World-Fisheries-Day-November-21/141778879204555

World of Fresh Water
This downloadable document from the EPA offers activities designed primarily for students in grades 4-6, though most are adaptable for older age groups. They address a spectrum of freshwater research efforts ranging from the methods used in collecting samples to ecosystem-level studies. Chapters include Water Facts and Usage, Ecosystems, Water Pollution, and Collecting, Sampling & Keeping Aquatic Organisms.
http://www.pinellas.wateratlas.usf.edu/upload/documents/Freshwater%20Research.pdf

World Heritage in Young Hands
This educational toolkit developed by the World Heritage Organization is designed to teach about the importance of the preservation of cultural and natural heritage around the world. The toolkit proposes classroom and extra-curricular activities, offers student activity sheets, and provides a series of enlarged photographs of World Heritage sites, a poster, a World Heritage map, stickers and thematic overhead projection sheets to be used for classroom discussions. It is available in English, French, and Spanish.
http://whc.unesco.org/education/sindex.htm

World Heritage Sites
The United Nations Educational, Scientific and Cultural Organization (UNESCO) encourages the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity. The World Heritage List has 754 properties - 582 cultural, 149 natural and 23 mixed properties in 129 States. The natural site datasheets provide plenty of information for comparisons. The *World Heritage Information Kit* is a downloadable document that provides a program overview. http://whc.unesco.org/pg.cfm?cid=1 .

World Maths Day
March 3, 2010 is World Maths Day, an opportunity for your students to compete with students around the world in solving fun math challenges. All ages and ability levels are encouraged to participate in this free program, which also awards prizes to the winners. http://www.worldmathsday.com/2010/Default.aspx?

World Meteorological Organization
The U.N.'s World Meteorological Organization website offers information on weather, climate, and water. The Topics section contains links to thematic pages on over four dozen areas of interest, including women in meteorology, Antarctic activities, disasters, and much more. The website also offers information on weather conditions and links to the Severe Weather Information Centre with a real-time interactive map of the world. http://www.wmo.int/

World Migratory Bird Day
World Migratory Bird Day is an annual awareness-raising campaign highlighting the need for the protection of migratory birds and their habitats. The theme for 2013 is Networking for Migratory Birds. Watch the trailer, register your event, and more. http://www.worldmigratorybirdday.org/2013/

World Network of Indigenous and Local Community Land and Sea Managers
The WIN (World Network of Indigenous and Local Community Land and Sea Managers) is a network that brings together indigenous and local community land and sea managers to share their knowledge and practices in managing ecosystems, protecting the environment, and supporting sustainable livelihoods. Check out the resources, read the stories, and more.
http://96.127.160.146/~worldind/

World Ocean Census
World Ocean Census: A Global Survey of Marine Life is the only officially sanctioned book to bring the Census of Marine Life (CoML) and its discoveries to the general reader. Written by this team of CoML scientists, the book offers a view into the ocean depths, enabling readers to go behind-the-scenes of the landmark study's findings and adventures. The website offers sample pages, the Table of Contents, and more. http://www.fireflybooks.com/bookdetail&ean=9781554074341

World Ocean Curriculum Catalogue
This resource page from the World Ocean Observatory Classroom offers a good list of links to educator resources, educational content, lesson plans, and activities. http://www.worldoceanobservatory.org/content/ocean-curriculum-catalogue

World Ocean Database
NOAA has released the World Ocean Database 2009, the largest, most comprehensive collection of scientific information about the oceans, with records dating as far back as 1800. The database provides approximately 9.1 million temperature profiles and 3.5 million salinity reports. The 2009 database also captures 29 categories of scientific information, including oxygen levels and chemical tracers, plus information on gases and isotopes that can be used to trace the movement of ocean currents.
http://www.nodc.noaa.gov/OC5/indprod.html

World Ocean Day – June 8
World Ocean Day is June 8, 2011, when organizations and individuals from around the world come together to celebrate our world ocean; reflect on the ocean's importance in our lives; and take time to do something good for our blue planet. The theme for 2011 is *Youth: the Next Wave for Change*. The theme for 2014 is *Together we have the power to protect the ocean*. The Ocean Project sponsors this website to coordinate World Ocean Day events with resources, tools, and activities. The Ocean Project sponsors this website, in English and Spanish, to coordinate World Ocean Day events with resources, tools, and activities.
http://worldoceansday.org/
http://worldoceansday.org/wod_theme.php

World Ocean Day
World Ocean Day, observed yearly on June 8, is an opportunity to celebrate our world ocean and our personal connection to the sea. The Ocean Project helps to coordinate events and activities worldwide with aquariums, zoos, museums, and the World Ocean Network. The website includes activity ideas and helpful hints to get you started. A list of some of last year's celebrations is posted, and this year's list will be up on the website by June 1, 2005.
http://www.theoceanproject.org/news/oceanday.html
www.worldoceanday.org
http://theoceanproject.org/wod/index.php

World Ocean Day
The World Ocean Day website offers inspiration for planning World Ocean Day (June 8, 2008) events, along with a global event map with everything from ocean excursions and watershed cleanups to community projects to stitch together a fluffy underwater display. List your event on the website to help get the word out. Download the resources in the media and outreach kit and additional offers, including Seas the Day bookmarks, Monterey Bay Aquarium National Seafood Wallet Guides, and 41pounds.org postcards.
http://www.theoceanproject.org/wod/

World Ocean Day
World Ocean Day, every June 8th, provides an opportunity to join with people around the world to celebrate our world's ocean. The theme for 2009, *One climate, one ocean, one future*, will help bring local and global attention to the impact climate change is having on the ocean, what that impact will mean for human life, and how we can all make important changes to reduce our $C0_2$ emissions. Enter your event, check out what's happening in your area, download the media and outreach kit, and more.
http://theoceanproject.org/wod/index.php

World Ocean Day Celebration – Washington, D.C. and Online
Join Coastal America and Partners, June 8, 2012 in Washington, D.C. for a day of events celebrating our oceans. Explore the Sant Hall, watch Otter 501 and various short MPA films, help draw ocean murals with cartoonist Jim Toomey, and much more. The Living Oceans Foundation will also present two live presentations from the Galapagos; see the website to link to the webinars.
http://www.coastalamerica.gov/
http://www.livingoceansfoundation.org/

World Ocean Journal
The World Ocean Observatory publishes the World Ocean Journal, a bi-annual e-zine on ocean culture and solutions to today's ocean issues. The inaugural volume includes essays, interviews, art, and more, profiling some of the impacts of the ocean on our lives.
http://publ.com/1Wj5dye#1

World Ocean Observatory
The World Ocean Observatory is dedicated to information, education and public discourse about the ocean defined as an integrated global social system. The intent is to communicate the full spectrum of ocean issues — climate, fresh water, food, energy, trade, transportation, public health, finance, governance, recreation and culture. The website contains links to ocean science, human uses, maps, databases, and more. The education section links to online curriculum and resources.
http://thew2o.net/

World Ocean Observatory Online Events
The World Ocean Observatory is dedicated to information, education, and public discourse about the ocean defined as an integrated global social system. Upcoming online events include explorations about the International Polar Year, Sea Turtles, Marine Education, Underwater Exploration, Ocean Energy, Coral Reefs, and more. Subscribe to the newsletter for reminders and essays about these events.
http://www.thew2o.net/events/index.php

World Ocean Passport
The World Ocean Network's mission is to inspire and foster a change in individual behavior towards a sustainable management of the global ocean, and its task is to coordinate communication to the public about ocean issues and marine resource management. The World Ocean Passport is an educational tool for its member organizations to promote ocean awareness and conservation with their visitors.
www.nausicaa.fr/reseau/ .

World Ocean Radio
World Ocean Radio, a project of the W2O, is a weekly series of five-minute audio essays available for syndicated use at no cost by community radio stations worldwide. It provides coverage of a broad spectrum of ocean issues, from science and education to advocacy and exemplary projects. Archived topics include maritime museums and the future, environmental justice, the Gulf Restoration Network, and many more. Recent topics include Conciliation of Interest, Mega-Cities by the Sea, Failed Governance, and more. Subscribe to World Ocean Radio's RSS feed, the weekly podcast on ITunes or find it on PRX.org, Audioport.org and at Stitcher.com.
http://thew2o.net/world-ocean-radio

World Ocean Radio Goes Global
To introduce World Ocean Radio to new audiences in Europe, Africa, South America, and Latin America, World Ocean Radio will broadcast in Swahili, French, Portuguese, and Spanish, providing the opportunity for organizations and stations to advance their own missions through collaboration and sponsorship.
http://www.worldoceanobservatory.org/world-ocean-radio

World Oceans Day – June 8
World Oceans Day, celebrated yearly on June 8, was created in 1992 at the UN Earth Summit in Rio de Janeiro. The Ocean Project has established a North American World Ocean Day planning committee in an effort to coordinate efforts, develop and suggest awareness-raising tools, resources, and activities, and establish an annual theme. Please let them know what you are planning so they can highlight your organization on their WOD website. Visit the website periodically as people send in their activities. Be sure to check out the free Octonaut resources for your young Disney Junior program viewers.
http://worldoceansday.org/
http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/Water%20and%20Ocean%20Governance/UN%20Oceans%20Day%20Flier.pdfhttp://www.theoceanproject.org/news/oceanday.html .
www.worldoceanday.org

World Parks Congress through OpenChannels
The World Parks Congress, held November 2014 in Sydney, Australia, drew more than 6000 attendees from 170 countries. MPA News and OpenChannels.org were there providing real-time, online coverage. Their highlights blog, Everything (marine) you need to know from the 2014 World Parks Congress, collates many of the main outcomes of the WPC, from national pledges to new reports and tools, and more. In addition, MPA News, Vol. 16, No. 2 focuses on outcomes from the congress.
http://openchannels.org/node/8097
http://depts.washington.edu/mpanews/issues.html#NovDec2014

World Register of Deep-Sea Species
The World Register of Deep-Sea Species is a taxonomic database of deep-sea species based on the World Register of Marine Species. The project provides an open-access source of quality taxonomic information on and imagery of deep-sea species.
http://www.marinespecies.org/deepsea/index.php

World Rivers Day
World Rivers Day, the last Sunday in September, highlights the values of rivers, strives to increase public awareness, and encourages the improved stewardship of rivers around the world. This year, it falls on September 28, 2014. Check out events near you, register your event, and more.
http://worldriversday.com/

World Science Festival – New York
The World Science Festival, June 1-5, 2011 in New York City, New York, offers a wide array of cutting-edge science programs designed to make the esoteric understandable and the familiar fascinating. Scientists, artists, and others join for a celebration of

science through discourse and debate, dance and theater, film, music and the visual arts.
http://worldsciencefestival.com/

World Water Day
The theme for this year's World Water Day, March 22, 2006, is *Water and Culture*. March 22, 2012 *Water and Food Security*. Check out the UNESCO website for examples of past celebrations and downloadable booklets to help celebrate water for life. Annenberg Media offers lessons about water in many of their free Video on Demand offerings, including:

- Water properties, The World of Chemistry, http://learner.org/redirect/march/wchem67.html
- Role of water in formation of landscapes and threats from pollution, Earth Revealed, http://learner.org/redirect/march/earth68.html
- Water is for Fighting Over, Human Geography: People, Places, and Change, http://learner.org/redirect/march/hgeog69.html
- Egypt: Gift of the Nile and Oil and Water, The Power of Place: Geography for the 21st Century, http://learner.org/redirect/march/place70.html

http://www.unesco.org/water/water_celebrations/index.shtml
http://www.unwater.org/worldwaterday/

World Water Day 2004
The UN International Strategy for Disaster Reduction and the World Meteorological Organization have been charged with coordinating World Water Day 2004 on March 22, 2004. This year's theme is *Water and Disasters*.
http://www.unesco.org/water/water_celebrations/index.shtml .

World of Water Films
The New England Aquarium has numerous free copies of World of Water films, good for folks outside of the United States who use VHS PAL format for viewing. Films include Keepers of the Reef, Surviving Sharks, and In Hot Water.
http://www.neaq.org/education_and_activities/teacher_resources/classroom_resources/educational_films/world_of_water_films.php
Contact Heather Tausig at htausig@neaq.org

World Water Monitoring Challenge
The World Water Monitoring Challenge™ is an international education and outreach program that builds public awareness and involvement in protecting water resources around the world by engaging citizens to conduct basic monitoring of their local water bodies. Check out the guides and lesson plans. Celebrate World Water Monitoring Day on September 18, 2013. "Like" WWMC on Facebook to enter to win a complimentary water test kit and t-shirt.
http://www.monitorwater.org/
https://www.facebook.com/WorldWaterMonitoringChallenge

World Water Monitoring Day
World Water Monitoring Day is September 18, 2014. Join Philippe Cousteau Jr. and EarthEcho as they kick off the World Water Monitoring Challenge. Students can interact with Philippe and youth from South America as they demonstrate how to conduct water testing and discuss the importance of water around the globe through a

World Water Monitoring Day Hangout. Order low-cost monitoring kits, check out the educator resources, sign up for the hangout, and more.
http://earthecho.org/news/HOA-091814

World Water Monitoring Day
America's Clean Water Foundation and the International Water Association invite your participation. On October 18, 2004 citizens of the global community will join in World Water Monitoring Day, a worldwide opportunity to positively impact the health of rivers, lakes, estuaries and other waterbodies. Volunteer monitoring groups, water quality agencies, students, and the general public are invited to test four key indicators of water quality: temperature, pH, dissolved oxygen, and turbidity. Register your activities on this website or check out links to some of the information and monitoring going on in your area.
http://www.worldwatermonitoringday.org/ .

World Water Monitoring Day
World Water Monitoring Day, September 18, 2010, is an international education and outreach program that builds public awareness and involvement in protecting water resources around the world by engaging citizens to conduct basic monitoring of their local water bodies. Participants are encouraged to register their site and report their data before December 31 to be included in the Year in Review report. Test kits can be ordered online and resources are available as free downloads.
http://wwmd.org/index.html

World Water Monitoring Day
World Water Monitoring Day is September 18, 2008. World Water Monitoring Day offers communities around the world a chance to positively impact the health of rivers, lakes, estuaries, and other waterbodies. Register your activities on this website or check out links to some of the information and monitoring going on in your area. Check out the water monitoring kits available through the website.
http://www.worldwatermonitoringday.org/index.html

World Water Monitoring Day
America's Clean Water Foundation and the International Water Association invite citizens and organizations to share in the experience of water quality monitoring. World Water Monitoring Day, October 18, 2003, serves as a global educational platform for watershed leaders, educators, and trained volunteers to help the public better understand how the actions of individuals in a watershed can impact many others.
http://www.worldwatermonitoringday.org/

World Wetlands Day, Yearly on February 2
World Wetlands Day takes place yearly on the 2nd of February and offers an opportunity "to undertake actions aimed at raising public awareness of wetland values and benefits in general and the Ramsar Convention in particular." The Ramsar Bureau hosts a central website for the use of everyone organizing World Wetlands Day activities. The theme for 2004 is "From the Mountains to the Sea - Wetlands at Work for Us", 2005 is *Cultural and biological diversity of wetlands*, and 2006 is *Her Future at Risk*. Information is also available in Spanish and French. The 2007 theme is *Fish for tomorrow?* . Be on the lookout for the photo contest, which runs February 2-March 2, 2015.
http://www.worldwetlandsday.org/
http://www.ramsar.org/wwd/wwd_index.htm

World Wide Biome Project
The World Wide Biome Project is designed to encourage students to learn about ecosystems in their locale and share their findings with students from around the world through the Internet. Students or classes do an evaluation of a habitat in their biome according to a standard method of investigation, and then send the data in to the World Wide Biome Project. Their data is then converted into a series of web pages. This allows students to learn from other projects and compare and contrast the information.
http://www2.kpr.edu.on.ca/cdciw/biomes/

World Wildlife Fund PSA Campaign
The World Wildlife Fund has launched a new Public Service Announcement (PSA) campaign to help the public make the connections between issues such as climate change, overfishing, and scarcity of freshwater as covered in the news, and how these trends can affect their lives.
http://www.worldwildlife.org/sites/videos/2009psas.html

WorldWideScience
The WorldWideScience site is a global science gateway that is meant to help connect a worldwide audience to various national and international scientific databases. The site is maintained by the Office of Science and Technical Information with the U.S. Department of Energy. Visitors to the site's homepage can click on an interactive map of the world's countries to locate participants and their websites. There is an advanced search option, along with contact information.
http://worldwidescience.org/

WorldWide Telescope
WorldWide Telescope allows visitors to explore the universe from a computer screen. Visitors can pan the sky and zoom in on stars, nebulae, and planets. Objects link to multiple information sources. The website offers a users guide, educator resources, and more.
http://www.worldwidetelescope.org

WoRMS
The World Register of Marine Species provides an authoritative and comprehensive list of names of marine organisms, including information on synonymy. While highest priority goes to valid names, other names in use are included so that this register can serve as a guide to interpret taxonomic literature.
http://www.marinespecies.org/

Wreck of the Portland
Partners from the National Undersea Research Center (NURC) and Stellwagen Bank National Marine Sanctuary conducted two live video broadcasts from the R/V Connecticut back to shore to the Pilgrim Monument and Provincetown Museum. The broadcasts are archived on the Internet, along with a slide show and additional materials.
http://www.nurc.uconn.edu/livedive/index.htm

Writers' Resources
Google offers links of resources for writers. Categories include education and training, journaling, style guides, and more.

http://www.google.com/Top/Arts/Writers_Resources/

Writing Across the Curriculum
George Mason University offers Writing Across the Curriculum with resources for people who teach college English courses and related subjects, in addition to many resources of general interest. The Teaching with Writing handouts include Creating Clear Assignments, Evaluating and Grading, and more. Resources for students include links to genre-specific writing resources, collaborative writing, and more.
http://wac.gmu.edu/

Writing Center
The University of Kansas offers this website to provide writing support for students who might be having trouble getting started with their own assignments or term papers, through writing tutorials and guide sheets. The website offers sections specifically designed for undergraduate or graduate students, including guides to crafting an effective thesis statement and working on pre-writing strategies. The Writing Guides section includes a sample writing gallery and an assignment planner.
http://www.writing.ku.edu/

Writing at Colorado State University
The Colorado State University has a set of online resources designed to help people become better writers, organized within ten thematic guides. Though the guides deal primarily with writing in engineering, they include Communicating as an Engineer, Project Notebooks, Environmental Policy Statements, and others that would be appropriate for readers of this newsletter.
http://writing.colostate.edu/guides/index.cfm?guides_active=engineer&category1=41

Writing Guidelines for Engineering and Science Students
The University of Vermont offers this helpful website for both students and educators alike. These guidelines for scientific writing are designed to help students communicate their technical work and contain advice, models, and exercises for common writing and speaking assignments in engineering and science. Some of the specific resources include how to write for different audiences and how to design both presentation slides and scientific posters; also included are sample memos, letters, and resumes.
http://www.writing.eng.vt.edu/

Writing Guidelines for Engineering and Science Students
Penn State University provides this web resource for engineering and science students with the models, exercises, and advice. These guidelines are designed to help students communicate their technical work. The website examples include many types of documents students will likely encounter in their schooling and eventual professions. The homepage offers links to both Student and Instructor Resources. Document types include formal reports, presentations, correspondence, and more.
http://writing.engr.psu.edu/

Writing Resource Center
Effective strategies for becoming a better writer are useful resources for all of us, and this website from Empire State College was developed specially for adult learners and faculty use. The website offers sections such as Grammar & Punctuation, ESL Resources, and Documenting Resources. The site contains specific resources that

include worksheets for faculty on how to conduct informal writing activities, to a writing exercise on developing a research question and much more.
http://www.esc.edu/ESConline/Across_ESC/WritingResourceCenter.nsf/homepageForm?OpenForm

Wyland Ocean Challenge, "Clean Water for the 21st Century"
The Wyland Ocean Challenge promotes student understanding of the complex and interrelated issues that affect our water systems through art. The program is a marine life art and science educational curriculum available free to every K-6 classroom. The program meets national standards for science and art, and includes art activities, case studies, and science experiments to teach students about the water on our planet.
http://www.wylandoceanchallenge.org

Wyland Ocean Challenge Cleanup
The Wyland Foundation, PADI, and Project AWARE have joined together for a 15-state, 16-city Wyland Ocean Challenge Coastal Celebration and clean-up tour, to inspire over 1 million people to promote, protect and preserve the nation's marine habitats. The campaign will be conducting a 1,700-mile series of cleanups and festivals along the east coast of the United States. The campaign will be feature music, celebrity speakers, family activities, prize giveaways, and community clean-up events.
http://www.wylandoceanchallenge.org/index.cfm?do=costalcleanindex .

Xeno-Canto
Xeno-Canto is a community database of shared bird sounds from the Americas and around the world. The website also offers bird songs of almost 4500 species, which can be searched by map, collection, and randomly.
http://www.xeno-canto.org/

Yale Climate Connections
Climate Connections is a daily public radio series produced by the Yale Center for Environmental Communication. The series aims to help radio listeners understand how climate change is impacting our lives and what diverse people and organizations are doing to reduce the associated risks.
http://www.yaleclimateconnections.org/climate-connections/

Yale Project on Climate Change
The Yale School of Forestry and Environmental Studies' Project on Climate Change offers resources and information to promote action on climate change. The resources are organized by category, including Business & Finance, News Media, Environmentalists & Civil Society, and more.
http://www.environment.yale.edu/climate/

YardMap
YardMap is a free, interactive, citizen science mapping project about habitat creation and low-impact land use from the Cornell Lab of Ornithology, designed to cultivate a richer understanding of bird habitat for both professional scientists and people concerned with their local environments. YardMap uses web technology to let users construct landscape maps using real satellite images of their own backyard. Map your yard, track birds, and measure your impact.
http://content.yardmap.org/

Year of Clean Water Outreach Materials – Nonpoint Source and Stormwater
The EPA website highlights different monthly topics to celebrate the Year of Clean Water and 30 years of the Clean Water Act. Materials include information brochures, posters, and even crossword puzzle placemats that can be customized for your organization. The Watershed Events newsletter highlights several education and outreach campaigns.
http://www.epa.gov/water/yearofcleanwater/month.html
http://www.epa.gov/owow/watershed/eventspring03.pdf

Year in the Life of Earth's CO_2
This NASA computer model gives visitors a new way to look at how carbon dioxide in the atmosphere travels around the globe throughout a yearly cycle.
https://www.youtube.com/watch?v=x1SgmFa0r04

Year of Science
The Year of Science 2009 website offers many reasons to celebrate science. Monthly celebrations include weather and climate, biodiversity and conservation, and more. For June's Ocean and Water theme, the website will feature a slide show entitled *A Day Without the Ocean*. They are collecting digital images (photos or scanned drawings) from the ocean education community, scientists, teachers, students, and anyone else interested, that illustrate what the world would be like if we lost this resource for a day.
http://www.yearofscience2009.org/

Year of Science Education Sampler
NOAA Education celebrates the 2009 Year of Science with a website and companion DVD, offering background materials, multimedia resources, informal activities, lesson plans, and curricula from across NOAA. The materials are geared for educators and students of grades 3-12. The resources from the DVD can be individually downloaded from the website.
http://oceanservice.noaa.gov/education/yos/

Year of Science June Theme: Ocean and Water
The Year of Science 2009 is a chance to celebrate science. Throughout the year, participating groups from around the world will engage the public in science and work to improve public understanding about how science works, why it matters, and who scientists are. The website includes educational activities, online games, and other resources.
http://www.yearofscience2009.org/themes_ocean_water/celebrate/

Year in Weather
This beautiful eight minute time lapse visualization, comprised of imagery from geostationary satellites, shows the entire year of weather across the globe during 2013. Commentary is from Mark Higgins, Training Officer at EUMETSAT, a global operational satellite agency. The satellite data layer is superimposed over NASA's Blue Marble Next Generation ground maps, which also change with the seasons.
http://www.youtube.com/watch?v=m2Gy8V0Dv78

Yellowstone Fires Interview Montage
Voices from the Past – Lessons for the Future is a video montage of lessons learned from the Yellowstone fires of 1988. The clip is about 12 minutes and is a sampling from 23 interviews and over 60 hours of video.
http://www.wildfirelessons.net/Home.aspx

Young Scientists Journal
The Young Scientists Journal is an international, peer-reviewed science journal written by and for young scientists ages 12-20. The journal publishes scientific research conducted by high school students and reviewed by scientists on an International Advisory Board. The editors are soliciting material from students in addition to scientific research, such as news items, reviews, cartoons, and more.
http://www.butrousfoundation.com/ysjournal/

Young Voices on Climate Change
Young Voices on Climate Change is a film series featuring young people who are making a difference by shrinking the carbon footprint of their homes, schools, and communities. Check out the movies and follow the project on facebook.
http://youngvoicesonclimatechange.com/

Your Local Ecosystem
What rivers and streams flow through your neighborhood? What wildlife is local to where you live? Foxes, deer, and rabbits use utility right of ways as corridors to cross even busy urban and suburban areas. This website from the Environmental Literacy Council offers links to information about your area, often by just inputting your zipcode.
http://www.enviroliteracy.org/article.php?id=287

Youth Changing the World: A Service Project Toolkit
This free guide from Youth Service America takes readers step-by-step through the process of identifying a community need to address and then planning, implementing, reflecting upon, showcasing, and celebrating a service project. The guide contains worksheets to lead students through each step, examples and mini-case studies of projects, a glossary of terms, and links to more resources.
http://www.ysa.org/

Youth in the Great Outdoors
The Department of the Interior has created the Office of Youth in the Great Outdoors to help coordinate efforts to employ, educate, and engage young people from all backgrounds in exploring, connecting with, and preserving America's natural and cultural heritage. Check out the Student Internship Opportunities, and watch this website as more information is added.
http://www.doi.gov/whatwedo/youth/

Youth Ocean Conservation Team
The Youth Ocean Conservation Team is a network of youth and adults who are passionate about taking action to protect the planet's marine ecosystems. The team provides an avenue for youth to share ideas and thoughts on relevant ocean conservation issues, gain advice and support for the ocean conservation projects they're working on, and collaborate with other young people involved in ocean conservation efforts.
http://www.stowitdontthrowitproject.org/pb/wp_f343c28a/wp_f343c28a.html

Youth Photo Collection
The Thank You Ocean campaign has initiated a youth photo project and for the next few months, they will debut one or two photos every week. Check out these simple but compelling images and share them with your networks.

http://www.facebook.com/media/set/?set=a.378478292228337.93808.110068422402660&type=1

Youth Venture
Ashoka's Youth Venture inspires and invests in teams of young people (leaders age 12-20) to design and launch their own lasting social ventures. Venturers start businesses, civil society organizations, and informal programs that address social issues, including the environment, education, diversity issues, and more. Youth Venture helps Venturers through the process of designing and launching their ventures, providing guidance, a process for designing and pitching a venture idea, and more.
http://www.genv.net/

Youth Wetlands Program - Louisiana
The Youth Wetlands Education and Outreach Program is a Louisiana 4-H program sponsored by the Office of Coastal Protection and Restoration, designed to heighten students' awareness of Louisiana's wetlands, wetland loss, and wetland conservation. The curriculum is tailored to students in grades 4-12 and all lesson plans are designed to follow Louisiana's Grade Level Expectations. Opportunities to participate in wetland restoration projects are available to teacher and students.
http://www.lsuagcenter.com/en/4H/about_4H/programs/science_engineering_technology/Youth+Wetlands+Week/

YouthGo
The Youth Portal at YouthGo.gov is the Department of Interior's primary source for youth-related online content. The Department of the Interior oversee one-fifth of the nation's land mass, including National Parks, National Monuments, and National Wildlife Refuges and helps people of all ages and backgrounds connect with their land and heritage. Get Out helps visitors get connected; Get Smart offers educational resources and links; and Get a Job helps youth find job, volunteer, and internship opportunities.
http://www.youthgo.gov/

Zooniverse
The Zooniverse from the Citizen Science Alliance follows citizen science projects. Readers may join a project and start contributing to data analysis of various kinds, while teachers will find education resources within the Community tab. The website links to Zoo Teach, with lesson plans and activities; Zoo Tools, for data collection; and more. Dive into the planktonic world, model Earth's climate using historic ship logs, and much more.
https://www.zooniverse.org/

Zoonotic Diseases: Work Smart, Stay Safe
How can people who work around wildlife stay safe from the spread of zoonotic diseases? This instructional 90-minute seminar created by the United States Geological Survey is designed to provide a basic overview of these diseases and their transmission. Visitors to the site can also learn about common routes of disease exposure and biosafety recommendations. The diseases discussed here include rabies, Lyme disease, and more.
http://www.nwhc.usgs.gov/outreach/mammalian_zoonotic_course.jsp

Zooplankton of the Atlantic and Gulf Coasts

This website is an electronic companion to Zooplankton of the Atlantic and Gulf Coasts: A Guide to their Identification and Ecology by William S. Johnson and Dennis M. Allen. It's purpose is to share information and new findings among users of the book and others engaged in collecting and observing zooplankton. The website offers a creature of the month, a photo gallery, links to other websites, and more.
http://www.zooplankton-online.net/