



**Looking for ideas to get your students  
excited about math and science?**

**NOAA provides many resources to  
inspire and engage your students.**

**And we've made those resources  
easy to find...**

**The Democratic Caucus of the House Committee on Science Presents:**

# **NOAA Resources for Teachers**

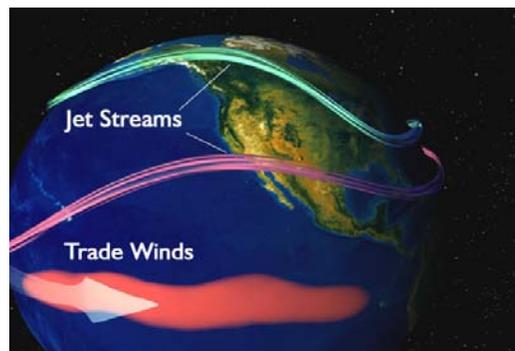
**<http://sciencedems.house.gov/resources/NOAAResources.htm>**

**Prepared at the direction of Representative Mark Udall,  
Member, House Committee on Science**



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The Effects of El Niño  
*Photo courtesy of NOAA*

The outline below and the pages that follow detail the variety of NOAA information located at 'Science Education & You' on <http://sciencedems.house.gov>.

Our site further breaks down the categories listed below to help you easily find useful tools and resources.

Resources for Teachers

General Websites

Visual Resources

Regional Educational Resources

NOAA Opportunities for Schools and Classrooms

NOAA Workshops and Summer Programs for Teachers

Resources for Students

K-8 Resources

9-12 Resources

Undergraduate and Graduate Resources

Amazing Images

Fun and Games

Older Kids

Younger Kids



*Image courtesy of NOAA*

## NOAA General Websites

### NOAA Educational Resources

This NOAA website is designed to help students, teachers, librarians and the public access the vast resources that have been produced.

Access information by age-specific and topic-specific categories and learn about all the exciting educational programs and materials that NOAA makes available to the public.

Website: <http://www.education.noaa.gov/index.html>



Deep-sea octocorals  
*Photo courtesy of NOAA*

### National Weather Service Education and Outreach

This page contains links to NOAA websites with a weather-related focus.



Website: <http://www.nws.noaa.gov/education.php>

*Image courtesy of the  
National Weather Service*

### NOAA Satellite and Information Service Education and Outreach

NOAA's Satellites and Information Service manages data relating to the Earth and solar environments. The education and outreach page provides links for anyone interested in learning more about our Earth-Sun environment. Additional materials include posters, slide sets, visualizations, handouts, quizzes and more!

Webpage: [http://www.nesdis.noaa.gov/outreach\\_edu.html](http://www.nesdis.noaa.gov/outreach_edu.html)

### NOAA's Office of Oceanic and Atmospheric Research

A very extensive webpage with links to information on climate, oceans and Great Lakes and weather and air quality. Site includes videos, projects, posters, graphics and images, data and information on class visits to NOAA research facilities!

Webpage: <http://www.research.noaa.gov/education>



*Image courtesy of NOAA*

## **NOAA's Sea Grant Program**

The Sea Grant Program was established in 1966 and became a part of NOAA in 1970. It is a nationwide network (administered through NOAA) of 30 university-based programs that work with coastal communities. The National Sea Grant College Program engages this network of the nation's top universities in conducting scientific research, education, training and extension projects designed to foster science-based decisions about the use and conservation of our aquatic resources.



Sea Grant is NOAA's primary university-based program in support of coastal resource use and conservation. Environmental stewardship, long-term economic development and responsible use of America's coastal, ocean and Great Lakes resources are at the heart of Sea Grant's mission. Its research and outreach programs promote better understanding, conservation and use of America's coastal resources.

A snapshot of Sea Grant activities includes improving public safety, developing sustainable fisheries and aquaculture, working with coastal communities to plan growth, discovering new drugs, combating aquatic nuisance species and educating thousands of students each year. The webpage also includes a clickable map to link directly to your state's Sea Grant webpage.

Website: <http://www.nsgo.seagrant.org>

Additionally, at the national level Sea Grant offers several fellowship opportunities for graduate students. These include Knauss marine policy fellowships in Washington, D.C., marine industry fellowships in cooperation with private industry and joint fellowships with NOAA fisheries. Learn more about marine and aquatic science literacy and Sea Grant accomplishments in this area.

Website: <http://www.seagrant.noaa.gov/funding/fundingfellowships.html>

## **Sea Grant Educators Network**

The Sea Grant Educators Network operates both locally and as a national force providing highly respected marine and aquatic science education nationwide and partnering with other national education efforts. The common goal of all Sea Grant programs is to provide educators with insights into contemporary marine and aquatic science issues and research and to also provide strategies to bring this information to their students.

The Sea Grant network offers a variety of programs and resources in marine and aquatic sciences for K-12 students and teachers, undergraduate and graduate students and the general public. These include publications, workshops, conferences, summer internships, informal education for the general public, radio programs, websites, videos and other electronic media on topics ranging from coastal ecosystems to marine biotechnology.

Website: <http://www.seagranted.net>

# NOAA Visual Resources

## NOAA Photo Library

This collection of digital photos spans centuries and much of the natural world from the center of the earth to the surface of the sun. Thousands of weather and space images, hundreds of images of our shores and coastal seas and thousands of marine species images are included throughout.

Website: <http://www.photolib.noaa.gov/index.html>



A Killer Whale, spy-hopping in the ice  
*Photo courtesy of NOAA.*

## Fish and Invertebrate Species Photos

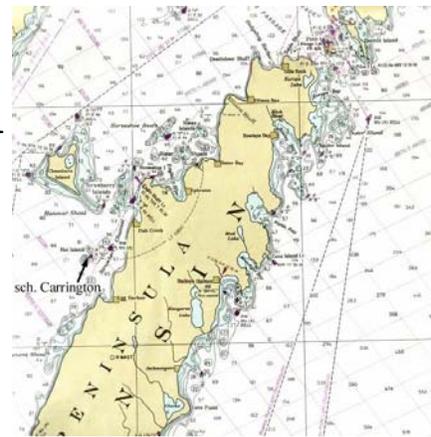
The Alaska Fisheries Science Center has a Fish and Invertebrates Species Identification Photo Gallery, searchable by species, family and phylum.

Website: [http://www.afsc.noaa.gov/race/media/photo\\_gallery/speciesID.htm](http://www.afsc.noaa.gov/race/media/photo_gallery/speciesID.htm)

## Wisconsin's Great Lakes Shipwrecks

Explore 17 of Wisconsin's Great Lakes shipwrecks through underwater video, historic photographs and archaeological discoveries. Immerse yourself in shipwreck exploration with a break-apart schooner hull and journal entries from underwater archaeologists. View dive guides, safety tips and guidelines for protecting our maritime heritage. Ask a direct question to an underwater archaeologist at the Wisconsin Historical Society.

Website: <http://www.wisconsinshipwrecks.org/index.cfm>



Northern Door Peninsula  
*Image courtesy of University of Wisconsin Sea Grant Institute*

## Lionfish Invasion!



NOAA's Ocean Service is documenting the invasion of the lionfish into the Atlantic Ocean. This webpage chronicles sightings of lionfish in U.S. waters with videos of the invaders taken by NOAA scientists. Scientists are using newly collected data and technology to study how the lionfish—labeled an "invasive species"—is affecting the ecosystem.

Website: <http://www.oceanservice.noaa.gov/education/stories/lionfish/runins.html>

A venomous, coral reef lionfish  
*Photo courtesy of NOAA*

## International Year of the Ocean

In recognition of the importance of the marine environment, the United Nations declared 1998 the International Year of the Ocean. This website consists of oceanic information, from educational posters (as shown on the next page) to information on ocean debris and buoys.

Website: <http://www.yoto98.noaa.gov>



Colorful tropical fish  
*Photo courtesy of NOAA*

## Fish FAQ: Fascinating Facts about Marine Life



Manatee

*Image courtesy of Visual Paradox*

Do fish sleep? How much electricity does an electric eel generate? Can lobsters grow new legs? How does a clam shell grow? What makes a Right Whale right? Learn the answers to these questions and many more on the Woods Hole Science Aquarium website.

Website: <http://www.nefsc.noaa.gov/faq>

## Earth Science Week

Since 1998, the American Geological Institute has organized Earth Science Week to help the public gain a better understanding and appreciation for the Earth Sciences and to encourage stewardship of the Earth. In 2005, Earth Science Week was October 9-15.

Website: <http://www.earthsciweek.org>

This year, NOAA provided educational resources for Earth Science Week kits mailed to teachers. Kits include posters, a calendar, bookmark, career information, CDs, newsletters, a lithograph and more. To request a kit, visit the webpage below.

Website: <http://www.earthsciweek.org/materials/index.html>



*Image courtesy of AGI*



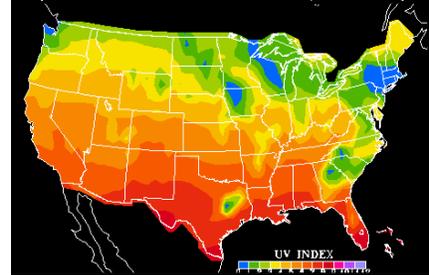
Ocean poster to educate on the importance of the marine environment

*Image courtesy of NOAA*

# Regional Educational Resources

## Offices and Locations

NOAA offices exist in virtually every area of the country. For an easy-to-navigate map of the United States, searchable by state or territory, visit <http://www.legislative.noaa.gov/noaainyourstate/noaainyourstate.html>. Site provides detailed information on each NOAA location, including contact information and additional websites.



In addition, **page 11** of this booklet lists National Weather Service locations by state. These locations, as well as national and regional centers, may be found by visiting <http://www.nws.noaa.gov/organization.php>.

National UV Index Forecast  
*Image courtesy of NOAA*

## Educational Offerings from Regional Centers

Regional NOAA Science Centers and laboratories provide educational resources for teachers and students. Numerous websites exist to direct educators to educational materials and various region-specific activities and opportunities of which to take advantage.



*Photo courtesy of NOAA*

Website: <http://www.nmfs.noaa.gov/science.htm>

As an example, the Northwest Fisheries Science Center, with website listed below, includes links to a multimedia library, information on local Alaska beaches and wetlands, a fisheries kids corner, United Nations Atlas of the Oceans, a wetland curriculum and information on site-specific facility tours.

Website: <http://www.nwfsc.noaa.gov/education/index.cfm>

# National Weather Service Offices and Locations

<u>Western Region</u>	<u>Central Region</u>	<u>Southern Region</u>	<u>Eastern Region</u>
<b>Alaska</b> Anchorage Fairbanks Juneau	<b>Illinois</b> Central Illinois Chicago	<b>Alabama</b> Birmingham Huntsville Mobile	<b>Maine</b> Caribou Portland
<b>America Samoa</b> Pago Pago	<b>Indiana</b> Indianapolis Northern Indiana	<b>Arkansas</b> Little Rock	<b>Maryland</b> Baltimore/Washington
<b>Arizona</b> Flagstaff Phoenix Tucson	<b>Iowa</b> Des Moines Quad Cities	<b>Florida</b> Jacksonville Key West Melbourne Miami Tallahassee Tampa Bay Area	<b>Massachusetts</b> Boston
<b>California</b> Eureka Los Angeles Sacramento San Diego San Francisco Bay Area San Joaquin Valley	<b>Kansas</b> Dodge City Goodland Topeka Wichita	<b>Georgia</b> Atlanta	<b>New Jersey</b> Philadelphia/Mt Holly
<b>Colorado</b> Denver/Boulder Grand Junction Pueblo	<b>Michigan</b> Detroit Grand Rapids Marquette North Central Lower Michigan	<b>Kentucky</b> Jackson Louisville Paducah	<b>New York</b> Albany Binghamton Buffalo New York City
<b>Guam</b> Guam	<b>Minnesota</b> Duluth Minneapolis	<b>Louisiana</b> Lake Charles New Orleans/Baton Rouge Shreveport	<b>North Carolina</b> Newport/Morehead City Raleigh/Durham Wilmington
<b>Hawaii</b> Honolulu	<b>Missouri</b> Kansas City/Pleasant Hill Springfield St. Louis	<b>Mississippi</b> Jackson	<b>Ohio</b> Cincinnati Cleveland
<b>Idaho</b> Boise Pocatello/Idaho Falls	<b>Nebraska</b> Hastings North Platte Omaha	<b>New Mexico</b> Albuquerque	<b>Pennsylvania</b> Central Pennsylvania Philadelphia/Mt Holly Pittsburgh
<b>Montana</b> Billings Glasgow Great Falls Missoula	<b>North Dakota</b> Bismarck Eastern North Dakota	<b>Oklahoma</b> Oklahoma City Tulsa	<b>South Carolina</b> Charleston Columbia Greenville/Spartanburg
<b>Nevada</b> Elko Las Vegas Reno	<b>South Dakota</b> Aberdeen Rapid City Sioux Falls	<b>Puerto Rico</b> San Juan	<b>Vermont</b> Burlington
<b>Oregon</b> Medford Pendleton Portland	<b>Tennessee</b> Knoxville/Tri-Cities Memphis Nashville	<b>Texas</b> Amarillo Austin/San Antonio Brownsville Corpus Christi Dallas/Fort Worth El Paso Houston/Galveston Lubbock Midland/Odessa San Angelo	<b>Virginia</b> Baltimore/Washington Roanoke Wakefield
<b>Utah</b> Salt Lake City	<b>Wisconsin</b> Green Bay La Crosse Milwaukee	<b>West Virginia</b> Charleston	
<b>Washington</b> Seattle/Tacoma Spokane	<b>Wyoming</b> Cheyenne Riverton		

To view the online list of national and regional offices/centers, visit <http://www.nws.noaa.gov/organization.php>

# NOAA Enrichment Opportunities for Students, Schools, and Classrooms

## Horseshoe Crab Fun Facts



Horseshoe Crab  
*Image courtesy of NOAA*

This website is designed to provide information about the horseshoe crab, a major Mid-Atlantic resource. Complete with readings, fun facts, a quiz, history, biology, ecosystem connection, human use and a horseshoe crab locator by beach.

Website: <http://www.ocean.udel.edu/horseshoecrab>

## Nab the Aquatic Invader! (4-10)

A website to teach kids the dangers of invasive aquatic plants and animals. Kids play the role of private investigators, conducting research, collecting evidence and studying background information of the various species to detect the "bad guys." The site also includes a teacher contest to win new classroom supplies, books or an education kit.

Website: <http://www.sgnis.org/kids/contest.htm>



## Online Weather School



Lightning  
*Photo courtesy of NOAA*

The National Weather Service provides information on a number of weather-related topics at their online weather school. Introduce your students to topics, ranging from the atmosphere, global circulations, synoptic meteorology and thunderstorms to lightning, tropical weather, remote sensing and more.

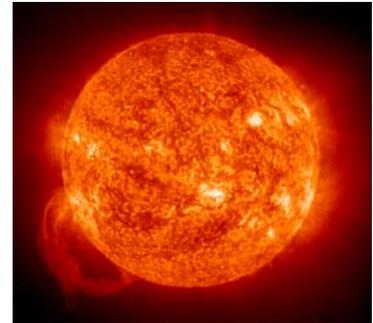
The site also includes complete information on locations of National Weather Service regional offices, quizzes by subject area and glossaries of weather-related phenomena.

Website: <http://www.srh.noaa.gov/jetstream/matrix.htm>

## **Brighten Up the Classroom**

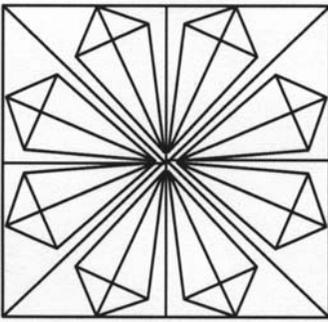
This interactive webpage with materials for kids and teachers includes a small database from which one can do everything from play computer games and do web activities using scientific data, such as "Fame & Fortune in Space Travel," to learning about radiation hazards, ordering posters and movies for the classroom and downloading PDF Files about solar maximum and radio wave propagation.

Website: <http://www.sec.noaa.gov/info/kids/index.html>



Solar activity  
*Photo courtesy of NOAA*

## **Education Materials from the NOAA Space Environment Center**



The NOAA Space Environment Center has a great deal of education and outreach materials available for K-12. Use the art of origami to make your own model of the sun and find tips on how best to view the aurora. Additional materials include coloring books, a radiation hazards game, various papers, posters and more. Videos are also available for a minimal fee.

Website: <http://sel.noaa.gov/Education/index.html>

Origami

*Image courtesy of NOAA*

## **Learning about Satellites and Remote Sensing**

Learn how meteorological satellites really work and what the imagery information they provide really means. The site is complete with links to help middle school and high school students with topical research, a glossary of related topics, class lectures, sample images and more!

Website: <http://noaasis.noaa.gov/NOAASIS/ml/education.html>



GOES, the Geostationary Operational Environmental Satellite  
*Image courtesy of NOAA*

# NOAA Summer Programs and Workshops for Teachers

## NOAA Science Camp

Six Regional NOAA Fisheries Science Centers exist throughout the country to provide youth with opportunities to experience NOAA science first-hand and learn how it applies to their local and global community. The following website contains links to each Center from which teachers and students can access a vast array of educational opportunities.

Website: <http://www.nmfs.noaa.gov/science.htm>



Kids at NOAA Science Camp  
*Photo courtesy of NOAA*

## NOAA Teacher at Sea Program



School of Pacific White Sided Dolphin,  
taken by a Teacher at Sea  
*Photo courtesy of NOAA*

The mission of the NOAA Teacher at Sea Program is to bring hands-on ocean research experience to the classroom. Teachers from elementary school through college go to sea aboard NOAA research and survey ships to work under the tutelage of scientists and crew. Armed with new understanding and experience, teachers bring this knowledge back to their classrooms.

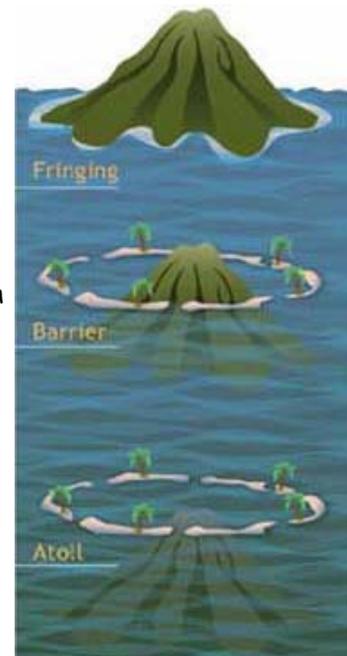
Website: <http://www.tas.noaa.gov/index.html>

## Discovery Classroom

The Discovery Classroom is a collection of formal lesson plans based on the major thematic areas of the National Ocean Service. All of the lessons emphasize hands-on activities using online data resources. Each inquiry-based activity includes components such as focus questions, learning objectives, audio/visual materials, background information, learning procedures and student activity handouts.

Additional resources on the website include kits on the basic scientific principals of corals, estuaries, geodesy and tides, as well as information on the Exxon Valdez oil spill.

Website: <http://www.oceanservice.noaa.gov/education/classroom/welcome.html>



Coral development  
*Image courtesy of NOAA*