

Climate Change Resources for Teachers & Students: *Learn the Science, Understand the Change and Take Action*

Climate Science

What science is important to know in order to understand CC?

National Science Teachers Association (NSTA) e-Learning Center, a professional development portal with webinars, seminars, symposiums and discussions on everything about climate science to how we teach about climate science, change and action, etc... Great site that can take you into many different directions. <http://www.nsta.org>

National Center for Atmospheric Research (NCAR) Online Education – Content from Web-based Courses The National Center for Atmospheric Research offered web-based climate change education courses from 2007 - 2010 for teachers seeking professional development on this difficult topic. In order to increase access to this information for teachers, we also made much of the content from these online courses available here, for you to use outside of an online course framework. Readings are available here from our courses "Introduction to Earth's Climate", "Earth System Science: A Climate Change Perspective", and from "Understanding Climate Change Today." <http://www2.ucar.edu/> and http://ecourses.ncar.ucar.edu/climate_change_series.html

NOAA Climate Services, a new web-based climate service center so to speak. The site is still a prototype, but will only be enhanced over the year with feedback. There is current climate data (Data & Services) with an interactive dashboard that students can use for reports or just play around with the time scale of the data. Understanding Climate provides national reports and Education has teaching resources, professional development and multimedia materials. <http://www.climate.gov/#climateWatch>

NOAA Regional Climate Centers, a federal-state cooperative effort. Six centers have past weather data, climate products and services. Go here for current weather data in the Northeast. <http://www.ncdc.noaa.gov/oa/climate/regionalclimatecenters.html>

NOAA Climate Program Office offers more links to other programs and less for students and teachers in terms of teaching modules, however, they do have the **Climate Literacy Principles & Earth Science Literacy Principles** which would be good to have pinned up in a classroom. http://www.cpo.noaa.gov/index.jsp?pg=/education/edu_index.jsp&edu=literacy

Windows to the Universe from National Earth Science Teachers Assoc., Look under Earth then Climate tabs and be lead to a webpage with an abundance of information on what is climate? What is weather? Climate models and events as well as paleoclimate, webinars, and climate literacy. This is an excellent climate change resource directed towards teachers– including creative and effective lesson plans - as well as differentiated background reading materials, animations, videos, interactive games for students. <http://www.windows2universe.org/earth/climate/climate.html>

United States Geological Services (USGS), Education resources on everything from geology, land use, water, biology and geography. The climate change and land use change section is full of data, remote sensing info. and more. http://www.usgs.gov/climate_landuse/

National Weather Service-Cooperative Observing Program, this NOAA program has been collecting weather observations since 1890. They have over 10,000 observing sites collecting precipitation, temperature, soil temperature and river levels. <http://www.nws.noaa.gov/om/coop/index.htm>

Earth Exploration Toolkit, a collection of online Earth system science activities. Each activity, or chapter, introduces one or more scientific data sets and analysis tools that enable users to explore some aspect of the Earth system. <http://serc.carleton.edu/eet/index.html>

Climate Literacy and Energy Awareness Network (CLEAN), Climate literacy principles paired with lessons and climate model activities. Learn how you can build your students' understanding of the core ideas in climate and energy science. <http://cleanet.org/index.html>

Climate Interactive, a site for upper grade levels to see how climate simulation models are created, what data can be manipulated as well as climate decision support systems. <http://climateinteractive.org/simulations>

NASA Global Climate Change The Climate and Health Analysis for Global Education Viewer (CHANGE Viewer) was built using NASA World Wind, an open source, 3-D geo-visualization tool. CHANGE Viewer allows the exploration of climate science, human and socio-economic datasets made available through the Data Library. <http://climate.nasa.gov/> and <http://climatechangehumanhealth.org/changeviewer/>

Climate Change

What are the **changes** that are taking place?

United States Global Change Research Program, the resources page is where you want to head for literacy framework and most importantly the toolkit. This toolkit is an interagency project to provide information for students and educators about the impact of climate change on wildlife and wildlands across the United States. <http://globalchange.gov/resources/educators>

Frequently Asked Questions from the IPCC 2007 AR4 Physical Science Report – The IPCC, of course, represents the most comprehensive clearing house for scientific information on climate change. The main IPCC page provides links to all IPCC reports, however, the FAQs page is actually accessible to most people and high school students, and accurately addresses many of the questions you may face in the classroom. www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-faqs.pdf

Climate Interpreter, climate change resources and training for informal educators as well as webinars, videos, articles and candid conversations. A new website so it is still growing and finding its niche. <http://www.climateinterpreter.org/>

Alliance for Climate Education (ACE), a great resource for teachers and students. A section for teachers with lesson plans and a place for students to go and find out what other students are doing to mitigate climate change. There are current articles for students to read and opportunity for an ACE assembly at your school. <http://www.acespace.org>

Climate Change Education.org, a website with many links to the various topics associated with climate change. <http://www.climatechangeeducation.org>

Skeptical Science, Getting Skeptical about Global Warming skepticism. Articles and discussions as well as handbooks and graphics. <http://www.skepticalscience.com/graphics.php>

Facing the Future, Another site with curriculum resources and professional development opportunities for educators. This site is easier to navigate through than others and has short lessons with plenty of citations to dive into further study. This site addresses many global issues like biodiversity and population consumption. They give the facts and ways we can address these issues. <http://www.facingthefuture.org/>

World Wildlife Fund (WWF), Climate Curriculum for Teachers. Your Climate your future, the science, changes and what we can do about it. <http://www.worldwildlife.org/climate/curriculum/item5944.html>

The USA National Phenology Network brings together citizen scientists, government agencies, non-profit groups, educators and students of all ages to monitor the impacts of climate change on plants and animals in the United States. The Educators' Clearinghouse houses educational materials (lesson plans, activity guides, syllabuses, project design plans), to provide a convenient and growing collection of resources on phenology learning both inside and outside of the traditional classroom setting. <http://www.usanpn.org> and <http://www.usanpn.org/education/clearinghouse>

Signs of the Season: A Maine Phenology Project, this program help scientists document the local effects of global climate change by observing and recording the phenology (seasonal changes) of common plants and animals living in their own backyards and communities. The plants and animals are easy to identify and it's a perfect project for a school. They are looking for more citizen scientists. <http://umaine.edu/signs-of-the-seasons/>

The Nature Conservancy Climate Wizard – This site presents an interactive model of projected temperature and precipitation data based on the major emission scenarios in the most recent Intergovernmental Panel on Climate Change's (IPCC AR4) report. The model can be adjusted to show global, U.S. or state data, though the resolution for smaller regions is limited. <http://www.climatewizard.org/>

UNESCO-Climate Change Starter's Handbook, an issues guide for educators, planners, and practitioners. Go here <unesdoc.unesco.org/images/0021/002111/211136e.pdf> to download a pdf. version.

WORLD Climate: Computer-Simulation-Based Role Playing Exercise from **Climate Interactive**, World Climate (formerly the Copenhagen Climate Exercise) is a role-playing climate simulation designed by MIT and Climate Interactive that gives groups from 6-80 an experience of reaching a global agreement to mitigate climate change. <http://climateinteractive.org/simulations/world-climate>
<http://climateinteractive.org/simulations>

The Global Learning and Observations to Benefit the Environment (GLOBE) program is a worldwide hands-on, primary, and secondary school-based science and education program. GLOBE's vision promotes and supports students, teachers, and scientists to collaborate on inquiry-based investigations of the environment and the Earth system working in close partnership with NASA, NOAA, and NSF [Earth System Science Projects \(ESSP's\)](#) in study and research about the dynamics of Earth's environment. <http://globe.gov/>

Environmental Protection Agency (EPA), A Student's Guide to Global Climate Change. Learn the basics, see the impacts, think like a scientist, and be a part of the solution. <http://epa.gov/climatechange/kids/index.html>

Field Notes from a Catastrophe: Man Nature and Climate Change by **Kolbert, Elizabeth** – An excellent and accessible resource, Kolbert's book blends science and true stories to help her audience understand the fundamentals of climate change and how we know what we know. Kolbert explains everything from climate models to phenology by bringing the reader along to Alaska, Costa Rica, and Vermont on her journey to understand what the experts and the natural world have to say.

Action

What **action** can students and communities take to address CC?

Community Collaborative Rain, Hail and Snow Network (CoCoRaHS), a network of volunteers many of which are schools that are trained to observe weather conditions and collect and submit weather data which is used by regional climate centers and national weather service to help predict weather patterns. CoCoRaHS is focusing on climate literacy by providing schools with lessons on weather and climate. The site has educational links for weather education and weather related activities. <http://www.cocorahs.org/>

Project Bud Burst, A network of people across the United States who monitor plants as the seasons change. A national field campaign designed to engage the public in the collection of important ecological data based on the timing of leafing, flowering, and fruiting of plants (*plant phenophases*). Project BudBurst participants make careful observations of these plant phenophases. The data are being collected in a consistent manner across the country so that scientists can use the data to learn more about the responsiveness of individual plant species to changes in climate locally, regionally, and nationally. <http://neoninc.org/budburst/> A page for educators helps guide classroom activities and getting students involved in PBB and becoming citizen scientists. <http://neoninc.org/budburst/educators/index.php>

Connecticut Climate Change, a state climate change website with lessons, actions and what's happening, not just for Connecticut residents. <http://ctclimatechange.com>

Earthman, Using music, art and technology to inspire people to protect their environment. Great videos, songs, etc... <http://www.earthman.tv/2004/index.html>

Blue Man Group: Earth to Humanity/America, a wake-up video by the performance group, Blue Man Group. <http://www.blugman.com/land/archive/earth/>

EPA: Adventures of the Garbage Gremlin, an EPA publication for students in grade K-5 to learn about recycling and waste reduction. It's a comic book with word games and puzzles along with what you can do outside of your home. Downloadable at <http://1.usa.gov/vru7lQ>

EPA: Climate Change Kit, Climate CHECK is a free, Excel-based kit that teaches high school students about the science, drivers, and impacts of climate change and provides the knowledge, tools, and resources to increase climate-change awareness and reduce greenhouse gas emissions at their school. Download CHECK at <http://1.usa.gov/zY3XFz> and check out EPA's Climate Change website at www.epa.gov/climatechange for more information.

More Climate Change Resources also found on **Watershed Matters** website at http://www.lcbp.org/watershedmatters/global_focus.html

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