

Websites and Other Resources for Students and Educators

(Revised 12-06-07)

A combination of renewable energy and energy conservation will go a long way to ensure a bright energy future for Oregon.

Use the websites below to begin your exploration of **renewable energy, climate change (global warming) and energy conservation**. These sites have curricula, supplementary activities and links to additional information. Most resources listed under the General Energy heading also include information on renewable energy, energy conservation and climate change.

Renewable Energy

(see also the General Energy Topics and Energy Conservation section below. Some listings have both renewable and nonrenewable energy information)

www.eere.energy.gov/education/

This U.S. Department of Energy site provides links to lesson plans, curriculum, science projects and activities, particularly on energy efficiency and renewable energy for grades K-12. Dr. E's Energy Lab at www.eere.energy.gov/kids/ provides kids with information and links on wind, solar, geothermal, alternative fuels, energy efficiency and renewable energy.

www.energyquest.ca.gov/projects/index.html#saving

Find science projects, many on renewable energy, on this California Energy Commission's Energy Quest website for grades K-12. The "Energy Story" has background on various forms of renewable energy at www.energyquest.ca.gov/story/index.html#table.

www.charlesedisonfund.org/Experiments/experiments.html

Science teaching experiments for elementary school students designed to stimulate interest in science and technology through easy-to-perform experiments. Include chapters on energy conservation, alternative energy sources, energy for the future and more.

www.nrel.gov/learning/

This National Renewable Energy Lab (NREL) site describes NREL's research in renewable energy technologies and also provides information on energy efficiency and various applications of renewable energy. Student resources for grades 6-12 are at www.nrel.gov/learning/student_resources.html. "Renewable Energy Activities: Choices for Tomorrow" includes a teacher's activity guide and basic energy, wind, water, biomass and solar energy activities for grades 6-8 at www.nrel.gov/docs/gen/fy01/30927.pdf. Research projects in renewable energy for high school students are at www.nrel.gov/docs/gen/fy01/30926.pdf.

www.uwsp.edu/cnr/wcee/keep/

Wisconsin's K-12 Energy Education Program (KEEP) web pages are dedicated to assisting K-12 teachers in accessing the professional development, resources, and connections needed to provide students with a well-informed understanding of renewable

energy. Student information and activities are also included. The Resource page at www.uwsp.edu/cnr/wcee/keep/Resources/index.htm has web-based info for elementary, middle and high school teachers.

www.rnp.org/default.html

Renewable Northwest Project's website has background information on renewable technologies and specific information on renewable energy projects in the Northwest.

Solar (see also the Renewable Energy section above)

www.nrel.gov/learning/sr_solar.html

The National Renewable Energy Lab site has background on solar for grades 7-12.

www1.eere.energy.gov/kids/roofus/

Explore golden retriever Rufus' solar dog house and all of its energy-saving features. Includes some activities. For lower to middle grades from U.S. Department of Energy.

www2.fsec.ucf.edu/en/education/k-12/curricula/

The Florida Solar Energy Center has curricula for grades K-12. Also includes web links to solar energy, alternative fuels, and other topics such as designing "green" buildings for energy-efficiency and using renewable energy.

www.solaror.org/

Solar Oregon (formerly the Solar Energy Association of Oregon) has general background, resources and lesson plans to introduce the basics of solar energy to upper elementary and middle school students. Lesson topics include energy sources, passive solar design, solar heating, and solar electricity. Lessons address a wide range of Oregon's Educational Benchmarks, inquiry-based learning and multiple learning styles. While targeted for 5th grade students, many of the activities and discussions can be used through the high school level. A CD of the above is also available.

See also the NEED website under General Energy Topics and Energy Conservation heading.

Wind (see also the Renewable Energy section above)

www.windpower.org/en/kids/index.htm

"Wind with Miller" was developed for students aged 12-14 and up. The site has an easy-to-read introduction to wind power, plus activities.

www.kidwind.org/

The KidWind Project is a team of teachers, students and engineers exploring the science behind wind energy. This site has curricula and materials for hands-on classroom learning activities for K-12. Also has links to other sites.

<http://sln.fi.edu/tfi/units/energy/blustery.html>

"Blustery Beginnings" is the Franklin Institute's introduction to wind for middle school students and teachers with an extensive online wind resources list that is good for older students also. Includes "Windy Things to Make," photo gallery, video gallery, booklist, figurative language and online resources. "Investigating Wind Energy" is at www.fi.edu/tfi/units/energy/windguide.html.

www.eere.energy.gov/windandhydro/windpoweringamerica/schools_teaching_materials.asp

This Wind Powering America site has links to numerous websites with wind curriculum resources and projects for various age levels, plus info on wind power for schools. The Wind Tutorial has good background info for older students at www.awea.org/faq/index.html.

www.energyquest.ca.gov/story/chapter16.html

Chapter on wind energy from the California Energy Commission's website. A project on building a wind gauge is at www.energyquest.ca.gov/projects/windmeasure.html. Wind speed can be measured using an anemometer like the one found at www.energyquest.ca.gov/projects/anemometer.html.

www.gepower.com/businesses/ge_wind_energy/en/kids_teachers/index.htm

GE Energy's "Just 4 Kids and Teacher's site has wind activities and curricula. Background info relates wind energy to solar energy from the sun's heating and cooling of the earth.

See also the NEED website under General Energy Topics and Energy Conservation heading.

Geothermal (see also the Renewable Energy section above)

www.geothermal.marin.org/ - Here's a site that has background, curriculum, sample activities and more.

www.bpa.gov/corporate/kr/ed/geothermal/homepage.htm

This curriculum unit describes geothermal energy in the context of the world's energy needs. It addresses renewable and nonrenewable energy sources with an in-depth study of geothermal energy -- its geology, history and many uses. Included are integrated activities involving science, as well as math, social studies and language arts. Whenever possible, high-order thinking and problem-solving skills have been suggested or included in the activities. Grades 4-8.

www.geothermal.marin.org/

The Geothermal Education Office produces and distributes educational materials about geothermal energy to schools, energy/environmental educators, libraries, industry, and the public. Many materials are downloadable or available for a low price. Has basic level through advanced information and a slide show.

See also the NEED website under General Energy Topics and Energy Conservation heading.

Biomass (see also the Renewable Energy section above)

www.need.org/needpdf/infobook_activities/PrilInfo/Biomass

National Energy Education Development (NEED) site has background and supplementary materials on biomass for all grade levels.

www.nrel.gov/docs/gen/fy01/30927.pdf

This National Renewable Energy Lab site has a teacher's activity guide for grades 6-8 with two biomass activities. Also includes wind, water and solar activities.

www.alliantenergy.com/docs/groups/public/documents/pub/p014404.hcsp

Find examples of how one utility uses biomass energy. Includes anaerobic digesters, landfill gas, switchgrass, wind and other renewables.

See also the NEED website under General Energy Topics and Energy Conservation heading.

Ocean (see also the Renewable Energy section above)

www.eduplace.com/rdg/gen_act/ocean/wave.html

This Houghton-Mifflin Education Center site features an activity called “Let’s Make Waves” to help children understand the nature of waves.

www.mms.gov/mmskids/PDFs/OceanEnergyMMS.pdf

The U.S. Department of the Interior provides background and activities on energy resources from ocean areas including wave energy, tidal energy, ocean currents, solar, wind and petroleum.

<http://eecs.oregonstate.edu/msrf/>

Oregon State University is leading the nation in research on wave energy.

See also the NEED website under General Energy Topics and Energy Conservation heading.

Climate Change (Global Warming) Resources on the Web (plus some printed materials)

www.npr.org/templates/story/story.php?storyId=9657621

Climate Connections is a National Public Radio and National Geographic series focused on how people shape climate and how climate shapes people. Extensive info on the Web site including a climate change game described below.

A five-part animated cartoon series looks at carbon, one of the main players in climate change, at www.npr.org/news/specials/climate/video/wildchronicles.html

www.princeton.edu/%7Ecmi/resources/stabwedge.htm

Stabilization Wedges: A Concept Game: The site has a downloadable teacher’s guide to a climate change game whose object is to find solutions that will reduce future carbon emissions. Students work in teams to compare the effectiveness, benefits and drawbacks of a variety of carbon-cutting strategies. Developed through a joint project with Princeton University, BP and Ford Motor Company. For older students and adults.

www.britishcouncil.org/zerocarboncity-education-support.htm

Education support materials from England’s Zero Carbon City are listed at this site – scroll down to “Climate Change Demonstrations” for 10 classroom activities that relate to climate change.

www.campaignearth.org - Learn how to make a difference. The site offers solutions to environmental problems including climate change. Includes a monthly challenge.

www.carboncounter.org/

The Climate Trust provides a Carbon Counter to calculate how much CO₂ your household emits in a year – your carbon footprint. Bonneville Environmental Foundation also has a carbon calculator at www.greentagsusa.org/GreenTags/calculator_intro.cfm

www.climatechange.gc.ca/english/

Canadian government site with information on how citizens can help reduce greenhouse gas emissions. Includes info and actions for adults, families and kids to take the “One Tonne Challenge” to reduce greenhouse gas emissions by 20 percent.

See also www.climatechange.gc.ca/onetonne/english/tips/guide.asp

www.climatehotmap.org/curriculum/index.html

“Global Warming: Early Warning Signs” is a downloadable curriculum guide for high school courses in biology, environmental science, geography, earth science, and others focusing on the society-environment interface. Developed by the Union of Concerned Scientists to accompany a science-based world map depicting the local and regional consequences of global climate change. The map was produced as a collaborative project by several environmental organizations, and has been peer-reviewed by scientists.

www.epa.gov/climatechange/wycd/school.html

The “At School” page on the Environmental Protection Agency site has background information for students, educators and school administrators and how all can play a key role in reducing greenhouse gas emissions. The site provides activities and resources for elementary, high school and college students and educators. Includes a climate change emissions calculator kit to estimate a school’s greenhouse gas emissions and to conceptualize ways to mitigate the school’s climate impact. Students gain detailed understandings of climate-change drivers, impacts, and science. They produce an emissions inventory and develop an action plan that could be submitted to their school district.

Also from EPA:

www.epa.gov/globalwarming/kids/

Find background for teachers and students: how to reduce greenhouse gas emissions, games, links, online greenhouse gas calculator, and climate animations.

Additional resources for educators and students are at

<http://yosemite.epa.gov/oar/globalwarming.nsf/content/VisitorCenterEducators.html>

Order “Climate Change, Wildlife and Wildlands,” a Toolkit for Teachers and Interpreters at

<http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsOutreachMaterialORWKit.html>

www.koshlandscience.org/exhibitgcc/index.jsp

The Science Museum of the National Academy of Sciences has background on global warming for teachers and middle and high school students. Also includes lessons and activities.

www.mtpc.org/cleanenergy/curriculum/about.htm

The Massachusetts Technology Collaborative provides curriculum materials, activities and resources for teaching about renewable energy and global warming for grades K-12.

www.participate.net/educators

An Inconvenient Truth Educator's Resource site includes downloadable curriculum: AIT in the Classroom. It is designed for high school science classrooms such as earth science, environmental science, and physics, but the materials can also be used in middle school civics and science classes. Also offers service learning opportunities.

www.pbs.org/wgbh/warming/

A teacher's guide and student interactive site based on "What's Up With the Weather," a NOVA and Frontline program from PBS (April 18, 2000).

www.pewclimate.org/global-warming-basics/climate_change_101/

Climate Change 101: Understanding and Responding to Global Climate Change is a series of brief reports from the Pew Center on Global Climate Change. The downloadable reports provide good background for older students and teachers. The reports include an overview, science and impacts, technological solutions, and actions.

www.windows.ucar.edu/citizen_science/budburst/

Join a national project, Project BudBurst, to help scientists learn about the prevailing climatic characteristics in a region over time. You can submit important climate change data on the timing of leafing and flowering of native trees, shrubs and flower in your area each year. The information will be compared to historical records to illustrate the effects of climate change. *Suitable for students, families, scouts, 4-H groups, gardening clubs, and botanical gardens.*

OTHER CLIMATE CHANGE RESOURCES

Book: Global Warming and the Greenhouse Effect - Good background and activities in science and math for grades 7-8; can be extended to grades 9-10. From Great Explorations in Math and Science, Lawrence Hall of Science, University of California. Available from Acorn Naturalists at www.acornnaturalists.com/store/index.asp

Book: Low-Carbon Diet by David Gershon - This "30 Day Program to Lose 5000 Pounds" is a fun easy-to-use guide to dramatically reduce your CO₂ output in just a month's time. Using behavior change research, this illustrated workbook offers more than a list of eco-friendly actions. It walks you through every step of the process, from calculating your current CO₂ "footprint" to tracking your progress.

Book: Teaching About Climate Change: Cool Schools Tackle Global Warming, edited by Tim Grant and Gail Littlejohn, New Society Publishers, Gabriola Island, B.C., CANADA. Available from Acorn Naturalists at www.acornnaturalists.com/store/index.asp or from Green Teacher at www.greenteacher.com/

DVD: "Generation to Generation: Global Warming in Oregon"

Free from Oregon Department of Energy, this short DVD (under 10 minutes) provides a context for global warming and its effects on Oregon. Narrated by Dr. Jane Lubchenko, Distinguished Professor of Zoology and Marine Biology at OSU and Co-chair of the Governor's Advisory Group on Global Warming. Call 503-378-4040 or toll-free in Oregon at 1-800-221-8035.

Magazine: National Geographic, September 2004. This issue is devoted to global warming.

General Energy Topics and Energy Conservation

www.alliantenergykids.com

Contains energy background for students, parents and teachers plus fun activities and games.

www.bpa.gov/Power/pl/columbia/page5cov.htm

Bonneville Power Administration's site focuses on water, fish, dams and energy.

www.eia.doe.gov/kids/

Online energy and science education with Energy Ant. Teacher lesson plans.

www.energyquest.ca.gov/

Discover new means for energy production and innovative ways to save energy on the California Energy Commission's education Web site.

www.need.org/

The National Energy Education Development Project (NEED) site has numerous online resources for *K-12 teachers and students* on all aspects of renewable and nonrenewable energy. *Infobooks* at www.need.org/EnergyInfobooks.php provide good background for other NEED activities and include fact sheets about all major energy sources, electricity, efficiency, conservation, transportation and emerging technologies. Other resources on the site include a guide to plan an energy unit, energy games and icebreakers, energy projects and activities and an energy "flipbook" of information and graphics about energy and energy sources. Curriculum is correlated to the National Science Standards.

www.nesea.org/buildings/

Northeast Sustainable Energy Association covers several energy education topics. Their high-performance green building page states that green building encompasses many different aspects from site selection to materials and energy-efficiency. You can find out how to save energy at home, read about various approaches to environmentally sound and energy-efficient building design, and learn about solar buildings.

www.nwcouncil.org

Excellent interactive maps showing major power facilities in the region (hydropower, coal, natural gas, wind and nuclear) are at www.nwcouncil.org/maps/power. Northwest Power and Conservation Council was authorized by Congress to give the citizens of the Northwest a voice in determining the future of key resources in the Columbia River Basin – electricity generation and fish and wildlife affected by the hydropower dams on the Columbia.

www.oilposter.org

This poster conveys a wealth of carefully researched information about oil depletion in a graphic format that anyone can quickly grasp. It is a map of our recent petroleum past and a glimpse into our post-peak future. The poster's main chart features a year-by-year rendering of worldwide oil production from 1859 to 2050 with projections of future production based on Colin Campbell's Oil Depletion Model.

www.plt.org/curriculum/energy.cfm

The "Energy and Society" curriculum kit from Project Learning Tree (PLT) offers energy education materials at the *Pre K-8 level*. Students learn about their relationship with energy, investigate environmental issues, and learn about renewable and nonrenewable energy. The curriculum helps students develop critical thinking skills to make decisions about their personal energy use. In addition to hands-on activities, the kit integrates music and dance. Kit includes an activity guide with background information for educators, music CD, dance video, and poster set. Available through teacher workshops sponsored by Oregon Department of Energy and the Oregon Forestry Education Program, or you can purchase directly at the PLT website. For workshop information, go to www.cof.orst.edu/cof/extended/ofep or call 1-800-554-6987.

Compiled by Kathy Shinn, Oregon Department of Energy

503-378-4040 or toll-free in Oregon at 1-800-221-8035

Kathy.Shinn@state.or.us

Visit our website at www.oregon.gov/energy

Please send feedback on items on this list and any new resources you come across.