



THE CORTESE KIDS CLIMATE CLUB PRESENTS

Tools for Teachers

A library of lessons, activities and other resources for the teaching of environmental and ecological studies in grades 3 through 12 – created by respected experts from throughout the world – compiled and offered by the Cortese Kids Climate Club and made possible through a grant from the **Theodore M. Bowen Foundation**.

Cortese Kids
Climate Club





We recognize that learning, understanding and applying the fundamental concepts of **environmental stewardship** is not only good for our planet, it is the **responsibility** of **every member** of our community.

With that goal in mind, we hope that the teaching strategies and learning activities presented in “Tools for Teachers” contribute to the joy and effectiveness of that learning experience.

Please visit www.cortesekidsclimateclub.org for online access to “Tools for Teachers” and more information on related Cortese Kids Climate Club (CKCC) environmental learning activities and contests.



Respectfully,

A handwritten signature in black ink that reads "Dave Cortese".

Dave Cortese, Founder, Cortese Kids Climate Club
President, Santa Clara County Board of Supervisors



What's Inside

Our Partners in Environmental Education 4 & 18

Grades 3-7: Anthology of Teacher Resources for Environmental Education 5

Energy & Natural Resource Conservation 6

Water 8

World Ecosystems 10

Pollution: Air & Water 12

Global Climate Change 14

Environmental Policy 16

Grades 8-12: Anthology of Teacher Resources for Environmental Education. . . . 19

Energy & Natural Resource Conservation 20

Water 22

World Ecosystems 24

Pollution: Air & Water 26

Global Climate Change 28

Environmental Policy 30





SPECIAL THANKS TO

Our Partners in Environmental Education

The generous supporters listed below are dedicated to environmental stewardship. Their leadership in helping future generations learn to understand, preserve, and cherish our resources is wonderful. We would like to take this opportunity to extend to them our heartfelt thanks for their support.

"TOOLS FOR TEACHERS" GRANT SPONSOR

Theodore M. Bowen Foundation

ANTHOLOGY OF TEACHER RESOURCES*

Environmental Education for Grades 3-7

The following anthology is divided into six subtopics within the overall theme of Environmental Education. Each resource is described in the following ways:

- **Teacher Resource:** The title/name of the resource
- **Description:** Type of resource
 - Lesson Plan: Complete lesson plan including goals/objectives and procedure for implementation
 - Media-Rich Lesson Plan: Complete lesson plan including video, online games and/or simulations
 - Video: Free online video
 - Online Interactive: Online game, simulation or activity
 - Teacher Guide: Collection of lesson plans
 - Background Information: Compilation of research created for teachers
- **Grades:** Appropriate grade levels
- **Source:** Resource owner

*Note: This is not an exhaustive list, but a compilation of suggested teacher resources for Environmental Education, Grades 3-7.





Energy & Natural Resource Conservation

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<i>Energy from the Sun Teacher Guide</i>	<ul style="list-style-type: none"> • Hands-on explorations that introduce scientific concepts of solar energy to students • Correlated to National Standards 	3-4	<ul style="list-style-type: none"> • U.S. Department of Energy; National Energy Education Development Project (NEED) • http://www1.eere.energy.gov/education/pdfs/solar_energyfromsunguideteacher.pdf
<i>Energy Flows Teacher Guide</i>	<ul style="list-style-type: none"> • Students learn about forms of energy, how energy is converted from one form to another, and how energy flows through systems. • Correlated to National Standards 	5-7	<ul style="list-style-type: none"> • National Energy Education Development Project (NEED) • http://www.need.org/needpdf/Energy%20Flows.pdf
<i>Snapshot of U.S. Energy Use Video</i>	<ul style="list-style-type: none"> • Experts estimate the amount of energy that is burned during daily activities, and how much CO₂ those activities contribute to the atmosphere. • Includes a background essay and discussion questions • Correlated to California Content Standards 	3-7	<ul style="list-style-type: none"> • Teachers' Domain; FRONTLINE/NOVA • http://www.teachersdomain.org/resource/tdc02.sci.life.eco.energyuse/
<i>What's Up with Weather? Your Carbon Diet Online Interactive</i>	<ul style="list-style-type: none"> • Examine factors that significantly impact energy consumption and the amount of CO₂ released into the air in the U.S. • Students determine ways that homes could be made more energy efficient. 	5-7	<ul style="list-style-type: none"> • NOVA • http://www.pbs.org/wgbh/warming/carbon/



Energy & Natural Resource Conservation CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
Waste Watchers <i>Lesson Plan</i>	<ul style="list-style-type: none"> Students conduct an audit of the energy they use in their own homes and create an action plan to reduce energy use. Correlated to National Standards 	4-7	<ul style="list-style-type: none"> Project Learning Tree; U.S. Department of Energy http://www1.eere.energy.gov/education/lessonplans/plans.aspx?id=244
Garbage Dreams <i>Media-Rich Lesson Plan</i>	<ul style="list-style-type: none"> Includes classroom activities, video and an interactive, challenging online game Students watch a film, play an online game and engage in recycling activities, learning the basic facts about the benefits of recycling, the economics of recycling and the challenges of waste management and recycling in their own communities. 	6-7	<ul style="list-style-type: none"> Independent Lens, PBS, Community Classroom http://www.pbs.org/independentlens/garbage-dreams/classroom.html
Fossil Fuels: Facing the Issues <i>Lesson Plan</i>	<ul style="list-style-type: none"> Students learn that fossil fuels are non-renewable resources, relate combustion reactions to fossil fuel burning, and explore environmental consequences associated with fossil fuel usage. Correlated to California Content Standards 	3-7	<ul style="list-style-type: none"> California Academy of Sciences http://www.calacademy.org/teachers/resources/lessons/fossil-fuels-facing-the-issues/



Water

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>How Wet is Our Planet? <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> Students engage in a hands-on activity, focusing on the amount and distribution of water in the earth's oceans, rivers, lakes, groundwater, ice-caps and atmosphere. 	3-7	<ul style="list-style-type: none"> The Groundwater Foundation http://www.groundwater.org/kc/activity6.html
<p>American River Salmon Educator Activity Guide <i>Teacher Guide</i></p>	<ul style="list-style-type: none"> Students learn about salmon and the American River watershed. Correlated to California Content Standards 	3-7	<ul style="list-style-type: none"> Project WILD http://www.dfg.ca.gov/projectwild/salmon.html
<p>Science in Your Watershed <i>Online Interactive</i></p>	<ul style="list-style-type: none"> Real-time data about local watersheds, including water quality data updated every 15 minutes Connects environmental education to math and media literacy 	5-7	<ul style="list-style-type: none"> U.S. Geological Survey http://water.usgs.gov/wsc/map_index.html
<p>Cycling Water Through the Environment <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> Students recognize the different forms that water takes and discover where it exists in their environment. Through class discussion and experiments, students model the water cycle and explore how it can be used to create fresh water. 	3-5	<ul style="list-style-type: none"> WGBH – Teachers' Domain http://www.teachersdomain.org/resource/ess05.sci.ess.watcyc.lp/watercycle/



Water

CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Global Water <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> Investigate how children in different parts of the world get their drinking water. Discover three methods of obtaining drinking water and evaluate the effectiveness of each method. Correlated to National Standards 	3-5	<ul style="list-style-type: none"> Thirteen/WNET: Planet H₂O http://www.thirteen.org/h2o/educators_lesson1.html
<p>Water Footprint Calculator <i>Online interactive</i></p>	<ul style="list-style-type: none"> Students and teachers will take a water tour with NGS through their home, yard, diet, and transportation and consumer choices. The resource offers an opportunity to pledge to cut your water footprint and help return more water to rivers, lakes, wetlands, underground aquifers and freshwater species. 	5-7	<ul style="list-style-type: none"> National Geographic Society http://environment.nationalgeographic.com/environment/freshwater/water-footprint-calculator/
<p>Water Cycle Game <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> Students learn the complex movement of water through the water cycle through role-playing. They identify the states of water and changes in state as it moves through the water cycle. 	6-7	<ul style="list-style-type: none"> National Oceanic and Atmospheric Administration http://response.restoration.noaa.gov/topic_subtopic_entry.php?RECORD_KEY%28entry_subtopic_topic%29=entry_id_subtopic_id%28entry_subtopic_topic%29=447&subtopic_id%28entry_subtopic_topic%29=27&topic_id%28entry_subtopic_topic%29=3



World Ecosystems

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
Ecuadorian Rainforest <i>Teacher Guide</i>	<ul style="list-style-type: none"> • Students learn about the wealth of biodiversity that thrives within the moist, green forests of a region of Ecuador known as the Chocó. • Correlated to National Science Standards 	4	<ul style="list-style-type: none"> • Rainforest Alliance • http://rainforest-alliance.org/curriculum/fourth
Desert Biome <i>Video</i>	<ul style="list-style-type: none"> • Video details the behaviors and habitats of some of the Sonoran Desert's creatures, focusing on the adaptations they use to survive in one of the most extreme environments in the world. • Includes a background essay and discussion questions • Correlated to California Content Standards 	3-7	<ul style="list-style-type: none"> • NOVA, Teachers' Domain • http://www.teachersdomain.org/resource/tdc02.sci.life.eco.desert/
Our Ocean's Planet: A Teacher Manual for Ocean Science <i>Teacher Guide</i>	<ul style="list-style-type: none"> • Multiple modular sections, each consisting of various topics of interest within ocean literacy 	4-7	<ul style="list-style-type: none"> • Central Caribbean Marine Institute • http://www.reefresearch.org/ccmi_website/outreach/outreach_02_00.htm



World Ecosystems CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Introduction to Keystone Species <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> • Students are introduced to ecosystems, food web and keystone species. They draw a simple food web and predict the impact keystone species have on an ecosystem. • Includes a glossary of terms • Correlated to National Geography and Science Standards 	3-5	<ul style="list-style-type: none"> • National Geographic Society • http://education.nationalgeographic.com/education/activity/introduction-keystone-species/?ar_a=1&ar_r=999
<p>Coral Reef <i>Teacher Guide</i></p>	<ul style="list-style-type: none"> • Interdisciplinary, hands-on curriculum to encourage students to think about the complexity of coral reefs and their surrounding environment, the threats that they are facing, and the possible solutions to these threats • Presents students with different ways to take action to save the reefs • Includes background information, glossary and bibliography of resources 	3-7	<ul style="list-style-type: none"> • Reef Relief • http://reefrelieffounders.com/pdf/coral-reef-teachers-guide-by-wendy-weir.pdf
<p>EEKO Travelers: Exploring Diversity <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> • Students explore the diversity of five distinct ecosystems. They use the interactive online resources from EekoWorld to learn about plants and wildlife, threats to different ecosystems, and different ways that people have made positive changes in the environment. • Correlated to National Standards 	4-5	<ul style="list-style-type: none"> • EekoWorld, PBS Kids Go! • http://www.pbs.org/parents/eeeworld/lessons4_2.html



Pollution: Air & Water

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
Air Pollution: What's the Solution <i>Teacher Guide</i>	<ul style="list-style-type: none"> • Online real-time data to guide student discovery of the science behind the causes and effects of outdoor air pollution 	6-7	<ul style="list-style-type: none"> • U.S. Environmental Protection Agency, NESCAUM, CIESE • http://www.k12science.org/curriculum/airproj/index.html
The Drill on the Spill: Learning About the Gulf Oil Leak in the Lab <i>Lesson Plan</i>	<ul style="list-style-type: none"> • Students consider the Deep-water Horizon oil spill in the Gulf of Mexico and related cleanup efforts. They design and execute experiments to learn about the effects of oil spills, and apply their findings to the coastal communities in the gulf region. Finally, they explore the economic and political impacts as well as the technological progress toward stopping the leak. • Correlated to National Standards 	6-7	<ul style="list-style-type: none"> • NY Times: The Learning Network • http://learning.blogs.nytimes.com/2010/05/05/the-drill-on-the-spill-learning-about-the-gulf-oil-leak-in-the-lab/
Air Quality Index <i>Online Interactive</i>	<ul style="list-style-type: none"> • Adapted from "Air Quality Index: A Guide to Air Quality & Your Health" by the U.S. EPA • Examines how data related to air pollutants is collected and reported • Includes teaching tips, discussion questions and a background essay • Correlated to National Standards 	6-7	<ul style="list-style-type: none"> • Teachers' Domain, U.S. Environmental Protection Agency • http://www.teachersdomain.org/resource/envh10.sci.life.eco.aqi/
Real Scientists: Frog Scientist <i>Video</i>	<ul style="list-style-type: none"> • Students learn about a scientific researcher who is studying how invasive species and pollution are causing frog populations to decline. Discover how his findings are helping people see the need for improving our care for the environment. 	3-7	<ul style="list-style-type: none"> • Dragonfly TV • http://pbskids.org/dragonflytv/scientists/scientist51.html



Pollution: Air & Water CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Saving the Bay: A Healthier Bay <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> Students investigate what the U.S. Geological Survey has discovered about the health of the Bay after four decades of monitoring, and learn about the largest local freshwater input into the South Bay – the San Jose/ Santa Clara Water Pollution Control Plant – and how wastewater treatment plants have limited the amount of pollutants that get into the Bay. Correlated to California Content Standards 	4-7	<ul style="list-style-type: none"> KQED/KTEH Public Television http://education.savingthebay.org/a-healthier-bay/
<p>Non-Point Source Pollution <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> Demonstrate what an average storm drain collects during a rainfall event and how the water from storms drains can impact the water quality and aquatic environments of local streams, rivers and bays 	3-7	<ul style="list-style-type: none"> California Environmental Protection Agency, State Water Resources Control Board, United States Environmental Protection Agency http://www.swrcb.ca.gov/water_issues/programs/outreach/education/school/games.shtml
<p>Pollution in Our Watershed <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> By building a simple watershed with paper and markers, students understand how pollution accumulates in our water sources, especially from agricultural pesticides. Correlated to California Content Standards 	3-7	<ul style="list-style-type: none"> California Academy of Sciences http://www.calacademy.org/teachers/resources/lessons/pollution-in-our-watershed/



Global Climate Change

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Climate Change Wildlife & Wildlands: A Toolkit for Formal & Informal Educators <i>Teacher Guide</i></p>	<ul style="list-style-type: none"> Provides classroom teachers and informal educators with the tools to educate middle school students about the science of climate change, its impacts on U.S. wildlife and wildlands, and what kids can do to help address the issue. 	6-7	<ul style="list-style-type: none"> U.S. Global Change Research Program http://www.globalchange.gov/resources/educators/toolkit/
<p>Global Climate Change Impacts in the U.S. <i>Background Information</i></p>	<ul style="list-style-type: none"> Highlights key findings of Global Climate Change Impacts in the U.S. – a state of knowledge report about the observed and projected consequences of climate change for our nation and people. It’s an authoritative scientific report written in plain language, with the goal of better informing public and private decision-making at all levels. 	3-7	<ul style="list-style-type: none"> NOAA http://www.globalchange.gov/images/cir/pdf/20page-highlights-brochure.pdf
<p>Changing Climate <i>Teacher Guide</i></p>	<ul style="list-style-type: none"> Supports teachers in teaching topics with real-world context, and provides them with the background to feel competent and comfortable when teaching about climate change A solid introduction to climate change in an accessible and reader-friendly manner 	3-7	<ul style="list-style-type: none"> National Geographic Society http://education.nationalgeographic.com/education/multimedia/climate/
<p>A Climate Conundrum <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> Students investigate the concept of climate change and discover how it can affect the habitats and lives of animals. Correlated to Project 2061 Benchmarks 	3-6	<ul style="list-style-type: none"> PBS Teachers – Eco Investigators http://www.pbs.org/teachers/ecoinvestigators/lesson-plans/air/a-climate-conundrum/



Global Climate Change CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Melting Ice <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> • Students explore the role that ice plays on Earth, the factors causing it to melt, and the local and global consequences of melting ice. • Correlated to California Content Standards 	6-7	<ul style="list-style-type: none"> • Teachers' Domain, WGBH • http://www.teachersdomain.org/resource/ipy07.sci.ess.watcyc.lpmeltingice/
<p>Sentinels of Climate Change <i>Online Interactive</i></p>	<ul style="list-style-type: none"> • Ice, which covers 10% of Earth's surface, is disappearing rapidly. Students can witness how climate change has affected glaciers, sea ice, and continental ice sheets worldwide. 	5-7	<ul style="list-style-type: none"> • NASA • http://climate.nasa.gov/GlobalIceViewer/index.cfm
<p>Global Climate Change and Sea Level Rise <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> • Students practice the steps involved in a scientific investigation as they learn why ice formations on land – not those on water – will cause a rise in sea level upon melting. • Correlated to California Content Standards 	3-7	<ul style="list-style-type: none"> • California Academy of Sciences • http://www.calacademy.org/teachers/resources/lessons/global-climate-change-and-sea-level-rise/
<p>Carbon Cycle Role Play <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> • Students discover that there is a finite amount of carbon on earth, which moves around in the environment, from one place to another. • Correlated to California Content Standards 	3-7	<ul style="list-style-type: none"> • California Academy of Sciences • http://www.calacademy.org/teachers/resources/lessons/carbon-cycle-roleplay-3-12/

Environmental Policy

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Species Search <i>Online Interactive</i></p>	<ul style="list-style-type: none"> Students learn about the Endangered Species Program by searching for endangered species in their state and region. 	4-7	<ul style="list-style-type: none"> U.S. Fish and Wildlife Service http://www.fws.gov/endangered/species/index.html
<p>Global Environment: Considering U.S. Policy <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> One-week unit that explores the relationship between U.S. public policy and the health of the planet. Designed to be used in an interactive format that engages students in active consideration of historical and current background material and then places them in the role of decision-makers as they explore divergent policy alternatives. 	6-7	<ul style="list-style-type: none"> The Choices Program http://www.choices.edu/resources/twtn_env_lesson.php
<p>America's Energy Future <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> Students investigate the sources and impact of U.S. dependence on carbon-based energy, analyze the energy policies of U.S. presidents since Jimmy Carter, and draft their own energy proposal. Correlated to National Standards 	7	<ul style="list-style-type: none"> PBS Newshour http://www.pbs.org/newshour/extra/teachers/lessonplans/us/jan-june09/energy_miller.html



Environmental Policy CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
Threatened Species and Public Policy <i>Media-Rich Lesson Plan</i>	<ul style="list-style-type: none"> Students learn about the Endangered Species Act and how it can impact people in our society. Correlated to National Standards 	6-7	<ul style="list-style-type: none"> American Field Guide http://www.pbs.org/americanfieldguide/teachers/threatened/threatened_sum.html
ENVIRO RULES: Student Civic Participation Influencing Environmental Policy <i>Lesson Plan</i>	<ul style="list-style-type: none"> Students learn about the Endangered Species Act and how it can impact people in our society. Correlated to National Standards 	6-7	<ul style="list-style-type: none"> Louisiana Public Broadcasting http://www.lpb.org/education/classroom/itv/envirotacklebox/teacherguide/module3/3erllsn1.htm
Energy Potential <i>Teacher Guide</i>	<ul style="list-style-type: none"> Supports teachers in teaching topics with real-world context and provides them with the background to feel competent and comfortable when teaching about energy policy Correlated to California Content Standards and Education & the Environmental Initiative units 	3-7	<ul style="list-style-type: none"> National Geographic Society http://education.nationalgeographic.com/education/multimedia/energy-potential/



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ANTHOLOGY OF TEACHER RESOURCES*

Environmental Education for Grades 8-12

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 - Teacher Guide: Collection of lesson plans
 - Background Information: Compilation of research created for teachers
- **Grades:** Appropriate grade levels
- **Source:** Resource owner

*Note: This is not an exhaustive list, but a compilation of suggested teacher resources for Environmental Education, Grades 8-12.



Energy & Natural Resource Conservation

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
Energy Jeopardy <i>Lesson Plan</i>	<ul style="list-style-type: none"> Review of the major sources of energy, electricity, energy consumption, energy conservation, and other energy information Correlated to National Science Education Standards 	8-12	<ul style="list-style-type: none"> National Energy Education Development Project (NEED) http://www.need.org/needpdf/Energy%20Jeopardy.pdf
Creating Biodiesel and Mitigating Waste <i>Lesson Plan</i>	<ul style="list-style-type: none"> This lab-based exercise introduces students to the concept of alternative fuels, and gives them an opportunity to produce their own biodiesel fuel using an analytical approach. Correlated to National Science Education Standards 	9-12	<ul style="list-style-type: none"> U.S. Department of Energy (USDOE) http://www1.eere.energy.gov/education/lessonplans/plans.aspx?id=309
From Pond Scum to Power <i>Online Interactive</i>	<ul style="list-style-type: none"> Students will investigate how and why algae make oil and why they make so much of it! Includes links to expert Q&A as well as free online video 	9-12	<ul style="list-style-type: none"> NOVA scienceNOW, PBS http://www.pbs.org/wgbh/nova/tech/algae-biodiesel.html
Secondary Energy Infobook <i>Background Information</i>	<ul style="list-style-type: none"> Fact sheets about major energy sources, electricity, consumption, efficiency, conservation, transportation and emerging technologies Correlated to National Science Education Standards and California Content Standards 	9-12	<ul style="list-style-type: none"> National Energy Education Development Project (NEED) http://www.need.org/needpdf/Secondary%20Energy%20Infobook.pdf



Energy & Natural Resource Conservation CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
Secondary Energy Infobook Activities <i>Teacher Guide</i>	<ul style="list-style-type: none"> • A companion workbook to the Secondary Energy Infobook • Explore general energy information and facts about energy sources • Correlated to National Science Education Standards and California Content Standards 	9-12	<ul style="list-style-type: none"> • National Energy Education Development Project (NEED) • http://www.need.org/needpdf/infobook_activities/SecondaryActivities/STeacher.pdf
Harness the Power of Wind <i>Online Interactive</i>	<ul style="list-style-type: none"> • Students discover how wind turbines capture the energy of moving air and convert it to electricity. 	8-12	<ul style="list-style-type: none"> • National Geographic Society • http://environment.nationalgeographic.com/environment/global-warming/wind-power-interactive/
Crisis in Japan: Understanding Nuclear Energy and Reactors <i>Media-Rich Lesson Plan</i>	<ul style="list-style-type: none"> • Learn about the nuclear crisis in Japan, and then research nuclear energy to prepare informative news bulletins. • Includes extensive background information and resources for lesson extension • Correlated to McREL National Standards and Common Core Standards 	9-12	<ul style="list-style-type: none"> • The New York Times: The Learning Network • http://learning.blogs.nytimes.com/2011/03/16/crisis-in-japan-understanding-nuclear-energy-and-reactors/

Water

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
Drought <i>Teacher Guide</i>	<ul style="list-style-type: none"> • Students investigate how drought conditions can develop and economic, environmental, and social impacts can follow. • Correlated to California Content Standards 	8-12	<ul style="list-style-type: none"> • EarthLabs • http://serc.carleton.edu/earthlabs/drought/index.html
Water Footprint Calculator <i>Online Interactive</i>	<ul style="list-style-type: none"> • Students and teachers will take a water tour with NGS through their home, yard, diet, and transportation and consumer choices. The resource offers an opportunity to pledge to cut their water footprints and help return more water to rivers, lakes, wetlands, underground aquifers, and freshwater species. 	5-7	<ul style="list-style-type: none"> • National Geographic Society • http://environment.nationalgeographic.com/environment/freshwater/water-footprint-calculator/
South Africa – The Play Pump: Turning Water Into Child's Play <i>Video</i>	<ul style="list-style-type: none"> • Learn about social entrepreneur Trevor Field and his PlayPump water project in South Africa. Examine economic, environmental and political issues surrounding Africa's freshwater challenges and solutions. 	8-12	<ul style="list-style-type: none"> • FRONTLINE/World • http://www.pbs.org/teachers/connect/resources/4915/
Surf Your Watershed <i>Online Interactive</i>	<ul style="list-style-type: none"> • Students will find their watershed and learn about organizations that are working to protect water quality. 	8-12	<ul style="list-style-type: none"> • U.S. Environmental Protection Agency (USEPA) • http://cfpub.epa.gov/surf/locate/index.cfm
Moving California's Water Supply <i>Multimedia Resource</i>	<ul style="list-style-type: none"> • Investigate how California's Central Valley Project and State Water Project stand as an engineering marvel that permanently transformed California by giving it the ability to move water from the north to the arid south. • Correlated to California Content 	9-12	<ul style="list-style-type: none"> • <i>Saving the Bay: The Story of the San Francisco Bay</i> • KQED Education • http://education.savingthebay.org/moving-californias-water-supply/



Water CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Who Will Get the Last Drop? <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> Students will investigate California's complex water system and the needs of the various stakeholders who depend on that water, using the Sacramento River as a case study. Aligned to California Content Standards 	9-12	<ul style="list-style-type: none"> KVIE Public Television http://www.kvie.org/programs/kvie/viewfinder/sacriveroflife/default.htm
<p>Build Your Own Watershed <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> This experiment illustrates the basic properties of a watershed: how water flows from higher elevations to lower elevations, and how watersheds are interconnected. 	8-12	<ul style="list-style-type: none"> California Environmental Protection Agency http://www.swrcb.ca.gov/water_issues/programs/outreach/education/school/docs/buildwatershed812.pdf
<p>The Hidden Water We Use <i>Online Interactive</i></p>	<ul style="list-style-type: none"> You might be surprised at how much water it takes to bring your hamburger to your plate or to make your favorite t-shirt. Compare apples to oranges, beer to wine, wind power to coal – and see how your choices add up. 	8-12	<ul style="list-style-type: none"> National Geographic Society http://environment.nationalgeographic.com/environment/freshwater/embedded-water/
<p>A Freshwater Story <i>Online Interactive</i></p>	<ul style="list-style-type: none"> Earth is a water wealthy planet, but only a tiny portion of its water is available to support people and aquatic species. Learn more about how much freshwater there is, and where it's found! 	8-12	<ul style="list-style-type: none"> National Geographic Society http://environment.nationalgeographic.com/environment/freshwater/freshwater-101-interactive/



World Ecosystems

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Guatemala's Changing Forest <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> Students explore criteria for classifying forests and then compare a tropical rainforest to a local forest. 	8	<ul style="list-style-type: none"> Rainforest Alliance http://www.rainforest-alliance.org/curriculum/eighth
<p>The Coral Reef Teacher's Guide <i>Teacher Guide</i></p>	<ul style="list-style-type: none"> In these lessons, students will investigate what coral reefs are and where they exist, discover details of life on a coral reef, and explore the benefits of coral reefs as well as the pressing threats and proposed solutions to these threats. 	9-12	<ul style="list-style-type: none"> Reef Relief http://reefrelief.org/wp-content/uploads/8HighSchool1.pdf
<p>Wetland Ecosystems II & III <i>Teacher Guides</i></p>	<ul style="list-style-type: none"> Includes two guides for teachers – middle and high school Guides assist educators in the presentation of cross-curricular science material and evaluation of student learning. Subject areas include environmental impact assessment, sociopolitical considerations in environmental solutions, biodiversity, sustainable development, adaptations, natural selection, wetland types, pollution and taxonomy. 	8-12	<ul style="list-style-type: none"> Ducks Unlimited http://www.greenwing.org/dueducator/lesson_plans.html



World Ecosystems CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
Symbiotic Strategies <i>Media-Rich Lesson Plan</i>	<ul style="list-style-type: none"> Investigate the many ways that species living in close proximity to each other might interact within an ecosystem. Determine the importance of all ongoing ecological relationships, even parasitic or predatory ones to a healthy ecosystem. Correlated to National Science Education Standards 	9-12	<ul style="list-style-type: none"> <i>Nature</i> http://www.pbs.org/teachers/connect/resources/6658/preview/
What are Ecosystems? <i>Background Information</i> <i>Media-Rich Lesson Plan</i>	<ul style="list-style-type: none"> Detailed information for educators regarding earth's ecosystems Includes access to media-rich lesson plans 	8-12	<ul style="list-style-type: none"> <i>Journey to Planet Earth</i> http://www.pbs.org/journeytoplanetearth/stateofthepланet/ecosystems.html
Compare the Poles <i>Online Interactive</i>	<ul style="list-style-type: none"> Explore the defining features of the Arctic and the Antarctic interactive adapted from the Woods Hole Oceanographic Institution. Includes a background essay for teachers and discussion questions Correlated to California Content Standards 	8-12	<ul style="list-style-type: none"> WGBH http://www.teachersdomain.org/resource/ipy07.sci.life.eco.comparepoles/



Pollution: Air & Water

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Interactive Map of Historic Oil Spills <i>Online Interactive</i></p>	<ul style="list-style-type: none"> This map shows the locations of oil spills and other incidents for which NOAA provided scientific support for the response. 	8-12	<ul style="list-style-type: none"> NOAA (National Oceanic and Atmospheric Administration) http://www.incidentnews.gov/map
<p>Threats to the Bay <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> Although San Francisco Bay is healthier than it was a half-century ago, it still faces threats from pollution and climate change. In 1972, the Clean Water Act made it illegal to dump untreated sewage, waste, and oil into “navigable waters.” Water quality is still a great concern, however, and pollution continues to find its way into the Bay. Correlated to California Content Standards 	9-12	<ul style="list-style-type: none"> KQED Education http://education.savingthebay.org/threats-to-the-bay/
<p>Pollution and Lung Health <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> The lesson features a demonstration on how incomplete combustion of fossil fuels releases particles into the air that can negatively affect human health and how we can protect ourselves from these effects. Includes a “Teacher Background” component Correlated to California Content Standards 	8-12	<ul style="list-style-type: none"> California Academy of Sciences http://www.calacademy.org/teachers/resources/lessons/pollution-and-lung-health/



Pollution: Air & Water CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Poisoned Waters: What is the Biggest Polluter of Water? <i>Video</i></p>	<ul style="list-style-type: none"> • In this special collection of educational resources from Frontline, correspondent Hedrick Smith investigates the growing hazards to our waterways and emerging threats to human health. • Includes “Poisoned Waters” Discussion Guide, background essay and discussion questions • Correlated to California Content Standards 	8-12	<ul style="list-style-type: none"> • FRONTLINE • http://www.teachersdomain.org/resource/frnpw10.guide.bigpolluters/
<p>What’s the Connection to Me? <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> • This lesson explores some of the different forms petroleum takes on as a component or ingredient in various manufactured products, some of the human health and environmental concerns associated with the use and disposal of these particular products, and ways to minimize the harmful effects of petroleum and petroleum-derived products on the environment. • Correlated to National Science Education Standards 	9-12	<ul style="list-style-type: none"> • Discovery Education • http://www.waterplanetchallenge.org/wpc/index.cfm/featured-resources/gulf-oil-spill/whats-the-connection-to-me/whats-the-connection-to-me-high-school/
<p>Pollution Quiz <i>Online Interactive</i></p>	<ul style="list-style-type: none"> • In this online quiz, students investigate the dirty dozen – air pollutants throughout our world. 	8-12	<ul style="list-style-type: none"> • National Geographic Society • http://environment.nationalgeographic.com/environment/global-warming/pollution-quiz/



Global Climate Change

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Climate Change Quiz <i>Online Interactive</i></p>	<ul style="list-style-type: none"> Students discover how much freshwater we have and how climate change is affecting our supply. 	8-12	<ul style="list-style-type: none"> National Geographic Society http://environment.nationalgeographic.com/environment/freshwater/freshwater-quiz-climate-change/
<p>Global Warming Effects Map <i>Online Interactive</i></p>	<ul style="list-style-type: none"> In this engaging and thought-provoking interactive, students investigate the impact of global warming on ecosystems, industry, health and more. 	8-12	<ul style="list-style-type: none"> National Geographic Society http://environment.nationalgeographic.com/environment/global-warming/gw-impacts-interactive/
<p>Greenhouse Effect <i>Online Interactive</i></p>	<ul style="list-style-type: none"> How does the earth stay warm? Students discover the importance of the greenhouse effect and why human activities today are intensifying this natural process. 	8-12	<ul style="list-style-type: none"> National Geographic Society http://environment.nationalgeographic.com/environment/global-warming/gw-overview-interactive/
<p>Carbon Cycle <i>Teacher Guide</i> <i>Lesson Plan</i> <i>Video</i></p>	<ul style="list-style-type: none"> Resources to help investigate the carbon cycle and it's interdependent components Information on how the carbon cycle is relevant to everyday life and how our activities are impacting the climate Basic concepts are covered in simple terms. Advanced data interpretation is available. Correlated to National Standards 	9-12	<ul style="list-style-type: none"> NOAA http://www.education.noaa.gov/Climate/Carbon_Cycle.html



Global Climate Change CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Global Climate Change Impacts in the Western U.S. <i>Background Information</i></p>	<ul style="list-style-type: none"> Information from the Global Climate Change Impacts in the U.S. report, which is largely based on results of the U.S. Global Change Research Program (USGCRP), and integrates those results with related research from around the world 	9-12	<ul style="list-style-type: none"> The NSTA Learning Center http://learningcenter.nsta.org/products/symposia_seminars/fall09/NOAA/webseminar1.aspx
<p>Carbon Cycle Poster <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> Students learn that carbon moves through all four of the earth's major spheres – biosphere, hydrosphere, atmosphere and lithosphere – and understand how we influence the carbon cycle and contribute to global climate change. Includes "Teacher Background" section Correlated to California Content Standards 	8-12	<ul style="list-style-type: none"> California Academy of Sciences http://www.calacademy.org/teachers/resources/lessons/carbon-cycle-poster-3-12/
<p>Extreme Heat <i>Video</i></p>	<ul style="list-style-type: none"> Though Wisconsin is notorious for frigid winters, extreme heat kills more people in the state than all other weather disasters – e.g., tornadoes, floods, blizzards – combined. Students explore this issue and more through the art of spoken word. Interdisciplinary approach to climate change education 	9-12	<ul style="list-style-type: none"> Climate Wisconsin: Stories from a State of Change http://climatewisconsin.org/story/extreme-heat
<p>Climate Change, Poverty and Women <i>Teacher Guide</i></p>	<ul style="list-style-type: none"> Explore the impact of climate change on poor people and, in particular, women. This controversial and contemporary issue challenges how we think about global interdependence, poverty and development. Media-rich lesson plans 	8-12	<ul style="list-style-type: none"> Oxfam Education http://www.oxfam.org.uk/education/resources/climate_change_poverty_women/



Environmental Policy

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<p>Mapping Coal Contaminants <i>Video</i></p>	<ul style="list-style-type: none"> • In this video, adapted from the Earth Island Institute, meet a high school student who took action to influence environmental policy in her community. • Includes a background essay and discussion questions • Correlated to California Content Standards 	8-12	<ul style="list-style-type: none"> • WGBH, Earth Island Institute • http://www.teachersdomain.org/resource/envh10.health.coalmap/
<p>World in the Balance: Who Will Take the Heat? <i>Lesson Plan</i></p>	<ul style="list-style-type: none"> • Examine the environmental, economic and political issues surrounding global climate change policy. • Conduct a role-play, and explore options available to tackle global climate issues. • Correlated to National Standards 	9-12	<ul style="list-style-type: none"> • NOVA • http://www.pbs.org/wgbh/nova/worldbalance/roleplay/heat.html
<p>Obama's Offshore Drilling Proposal: Drill Baby Drill? <i>Media-Rich Lesson Plan</i></p>	<ul style="list-style-type: none"> • Explore President Barack Obama's policy on offshore oil exploration and examine the potential costs and benefits of this policy. • Role-play interested advocacy groups to develop your own public policy for offshore oil exploration. 	9-12	<ul style="list-style-type: none"> • PBS Newshour Extra • http://www.pbs.org/newshour/extra/teachers/lessonplans/us/jan-june10/offshore_oil.html



Environmental Policy CONTINUED

TEACHER RESOURCE	DESCRIPTION	GRADES	SOURCE
<i>The Gulf Oil Disaster Media-Rich Lesson Plan</i>	<ul style="list-style-type: none"> • Students explore a range of issues raised by the 2010 oil disaster in the Gulf of Mexico including impact, U.S. oil dependency, and policy. • Includes links to online resources • Includes a PowerPoint of political cartoons 	9-12	<ul style="list-style-type: none"> • The Choices Program • http://www.choices.edu/resources/twn_gulf_oil.php
<i>Energy & Environment Background Information</i>	<ul style="list-style-type: none"> • Summary of current White House policies in relation to the environment 	8-12	<ul style="list-style-type: none"> • The White House • http://www.whitehouse.gov/issues.energy-and-environment
<i>The Powers That Be Media-Rich Lesson Plan</i>	<ul style="list-style-type: none"> • Students investigate past energy legislation, and then write letters to Congress from the perspective of citizens trying to influence the original passage of these bills. • Correlated to National Standards 	9-12	<ul style="list-style-type: none"> • The New York Times: The Learning Network • http://learning.blogs.nytimes.com/2003/04/14/the-powers-that-be/



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