



Connections

California Regional Environmental Education Community (CREEC) Network

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TEACHING ABOUT CLIMATE CHANGE



Celeste Royer
Director
CREEC Network

There is considerable press these days about climate change and global warming. Scientific evidence shows that we face serious environmental challenges that we must address with urgency. We must act now to reduce greenhouse gases, reduce the human impact on Earth, and provide future generations with a healthy planet. As educators, we should be as well versed in the topic as possible so we impart accurate information to our students. A first step is to understand the definition of several key terms.

The term climate change is often used interchangeably with the term global warming, but according to the National Academy of Sciences, "the phrase 'climate change' is growing in preferred use to 'global warming' because it helps convey that there are other changes in addition to rising temperatures."

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun; natural processes within the climate system (e.g. changes in ocean circulation); or human activities that change the atmosphere's composition (e.g. through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.)

Global warming is an average increase in the temperature of the atmosphere near the Earth's surface and in the troposphere which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, "global warming" often refers to the warming that can occur as a result of increased emissions of greenhouse gases (GHG) from human activities.

It is critically important that students learn the basic principles of climate change and global warming. We want students to understand the hydrologic and carbon cycles, what contributes to greenhouse gases, threats to water quality and quantity, oceanic changes and impacts to terrestrial habitats, and impacts to food production. Students and educators all play a key role in reducing greenhouse gas emissions. Teachers can learn how to bring climate change science to life for their students using quality curriculum with activities that build students' knowledge and leads to local action. Students can investigate everyday actions at their schools and how these actions relate to climate change. Often, students recommend changes in behaviors at school and at home that contribute to energy and costs savings. Students are part of the solution to our growing crisis. Equipped with sound scientific knowledge, they can assist in caring for the Earth.

Fortunately there are numerous resources and curricula available to help educators learn and teach about climate change. This issue of CREEC Connections links you to key websites, references, books, and curricula about climate change and global warming. California is a leader among the states in addressing climate change and offers numerous web-based references: <http://www.climatechange.ca.gov>. The Education and the Environment Initiative (EEI) curriculum currently in development will include climate change in six different units.


The U.S. EPA also houses a climate change website at <http://www.epa.gov/climatechange/index.html>. I encourage you to read these resources to increase your own knowledge about climate change and global warming. Then take the more important step and teach others what you have learned. Whether you teach PreK-12 or college students or work with employees in your school or organization, every effort made toward reducing GHGs and reducing our carbon footprint will contribute to a healthy planet.

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California Climate Change Portal

The **CA Climate Change Portal** contains information on the impacts of climate change on California and the state's policies relating to global warming. It is also the home for the **CALIFORNIA CLIMATE CHANGE PORTAL** California Climate Change Center, a "virtual" research and information website operated by the California Energy Commission through its Public Interest Energy Research (PIER) Program. The page about The Climate Action Team has many reports and fact sheets posted with climate change information. The Publications page has additional climate change resources. For example, *Our Changing Climate* is a summary report assessing the risks to California and includes information about public health, water resources, agriculture, forests and landscapes, rising sea levels, and managing global warming. To read any of the numerous documents and for more information about climate change, visit <http://www.climatechange.ca.gov/>.

Intergovernmental Panel on Climate Change

 The **IPCC** was established to provide the decision makers and others interested in climate change with an objective source of information about climate change. The IPCC does not conduct any research nor does it monitor climate related data or parameters. Its role is to assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts, and options for adaptation and mitigation. The IPCC website houses numerous documents and reports on climate change. Climate Change 2007 is the 4th Assessment report completed and can be read at <http://www.ipcc.ch/ipccreports/assessments-reports.htm>.

Pew Center on Global Climate Change


The **Pew Center's** website has information on global climate change basics including an introduction to global warming, fact sheets, and a kids' page. To help more kids better understand global warming, the Pew Center recently collaborated with Nickelodeon to research children's and parents' attitudes and behaviors toward the environment. Nickelodeon is using the information to launch a new, interactive campaign called [The Big Green Help](#). For more information or to learn more about this program, visit <http://www.pewclimate.org/global-warming-basics>.

Climate Literacy: The Essential Principles of Climate Sciences K-12

This climate-oriented guide to teaching science standards identifies essential principles and fundamental concepts for Ocean Literacy and related work in other areas of earth systems science education. It was modeled after the work conducted by the American Association for the Advancement of Science (AAAS), Project 2061 and other organizations. To read or download the guide, visit <http://www.climate.noaa.gov/education/>.



The Encyclopedia of Earth

 The **Encyclopedia of Earth** is a new electronic reference about the Earth, its natural environments, and their interaction with society. The Encyclopedia is a free, fully searchable collection of articles written by scholars, professionals, educators, and experts who collaborate and review each other's work. The articles are written in non-technical language and will be useful to students, educators, scholars, professionals, as well as to the general public. To search the encyclopedia, visit <http://www.eoearth.org/>.

California Climate Change & Energy

This website is a great resource for lesson plans, curriculum, field trip opportunities and more on climate change and energy. The resources are for K-12 teachers, universities, kids and families, and community groups. Visit <http://climatechangeeducation.org> for more information.




Climate Change by the Numbers

If you are interested in seeing the California and U.S. impacts on climate change, the South Coast Air Quality Management District has a great two-page flier that captures all these numbers. To download the flier, visit http://www.aqmd.gov/aqmd/climate_change_gateway.html and locate the flier under publications.



An Inconvenient Truth in the Classroom

 A series of lessons designed for 9-12 grade science classrooms is available as a companion to the feature documentary **An Inconvenient Truth**. The lessons are designed to engage students in discussions about global warming and are correlated to National Science Education Standards. To download the lessons, visit <http://www.climatecrisis.net/>.

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Resources for Environmental Literacy

One of the five teaching modules in this middle/high school guide for teachers, published by NSTA and the Environmental Literacy Council, focuses on Global Climate Change. The module provides teachers with background information, approaches to teaching about climate change, and student activities. To learn more about the module, visit <http://www.nsta.org/store>.



The Challenge of Global Warming

The Fall 2006 issue of California Journal of Science Education published by CSTA includes several key topics such as definitions of global warming and its causes, GeoSigns: The Big Thaw, EcoSigns and TimeSigns, Assessing Risks to California, FAQs on Climate Change, and Things you can do to reduce global warming. Back issues cost \$10. For more information, visit http://www.casience.org/csta/pub_globalwarmingjournal.asp.



Global Warming & the Greenhouse Effect

This Lawrence Hall of Science guide focuses on [Lawrence Hall of Science](http://www.lhs.berkeley.edu) global climate change and shows how scientific knowledge influences public debate and policy. It also shows the interconnections between science and technology, as well as among science, society and the environment. Through a variety of laboratory activities, simulations, and discussions, students focus on global warming issues and explore the related social and ecological consequences. The unit helps 7th and 8th grade students develop investigative skills as they conduct and analyze controlled experiments. Throughout the unit, students receive graphs of actual data to interpret and discuss. Students also look at their role as responsible citizens and examine what choices and actions they can take related to this issue. For more information about this guide, visit <http://www.lhs.berkeley.edu>.

Cal Alive!

Cal Alive!, produced by the California Institute for Biodiversity, celebrates the rich biological heritage of California, offering thorough background information on the geology, climate and water, ecology, and human history that characterize the diverse habitats of the state. Designed for use in 4th to 8th grades, the Cal Alive! Classroom Guide is the companion tool for the Professional Edition Cal Alive! CD-ROMs. It stands alone as a curriculum resource, offering overviews, activities, projects, and resources for studying California's biomes, habitats, plants, and animals. To find out more about Cal Alive, visit <http://www.calalive.org/>.



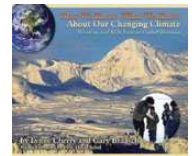
Annenberg Media

Annenberg Media online provides numerous educational resources for teachers. **The Habitable Planet: A Systems Approach to Environmental Science** is an online course for high school teachers that includes an overview of the Earth's systems as they exist independently of human influence. Following this introduction, the course explores the effect that human activities have on the different natural systems. Topics include human population growth and resource use, increasing competition for fresh water, and climate change. For more information, visit <http://www.learner.org/resources/series209.html>.



How We Know What We Know About Our Changing Climate: Scientists and Kids Explore Global Warming

When the weather changes daily, how do we really know that Earth's climate is changing? Here is the science behind the headlines - evidence from flowers, butterflies, birds, frogs, trees, glaciers and much more, gathered by scientists from all over the world, sometimes with assistance from young "citizen-scientists." Here is what young people, their families, and teachers can do to learn about climate change and take action. Climate change is a critical and timely topic of deep concern, here told in an age-appropriate manner, with clarity and hope. Kids can make a difference! This book combines the talents of two uniquely qualified authors: Lynne Cherry, the leading children's environmental writer/illustrator and author of *The Great Kapok Tree*, and Gary Braasch, award-winning photojournalist and author of *Earth Under Fire: How Global Warming is Changing the World*. For information, visit http://www.dawnpub.com/shopping_cart/INDEX.CFM?ProductID=135&do=detail.



Green Matters - Global Warming

Film Ideas has produced a 9-part DVD series which offers viewers a look into what's being done around the world and what we can also do to help reduce our carbon footprint. Each program brings hopeful information from governments, corporations, environmental agencies, and individuals who are finding ways to improve our planet. Using the latest global perspective, this life changing eco-friendly series deals with all things "green", whether it's organic, recyclable, sustainable, or bio. The DVD on Global Warming addresses trends that are occurring because of greenhouse gases in the atmosphere or a cyclical change in the weather and investigates this global issue from the polar Arctic to the polar Antarctic. To preview the DVD, visit <http://www.filmideas.com/greenmatters.html>.



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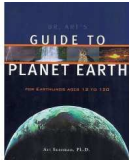
Facing the Future



Facing the Future's positive, solutions-based programming is designed by and for teachers, and brings critical thinking about global issues to students in every walk of life. They work within the education system to help teachers help students achieve academic success, while preparing them to create and maintain positive, healthy, and sustainable communities. They provide curriculum resources, teacher workshops, and service learning opportunities used by teachers, schools, and districts in all 50 states and over 60 countries. Lesson plans, units, and textbooks are available on climate change and global sustainability for all grades. Visit <http://www.facingthefuture.org/> for more information.

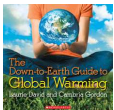
Dr. Art's Guide to Planet Earth

Dr. Art's Guide explains how our planet works. It includes the book, a theatre show, and a web site. Humans can dramatically change the way our planet works as a whole. Each of us in our daily lives can do things that together cause changes in the global climate, Earth's ozone shield, and its web of life. Is the situation hopeless? Is it all too hard to understand? No, no and no again. Dr. Art's Guide to Planet Earth provides a simple yet powerful way to understand how our planet works and what we can do about today's global and local environmental issues. For more information, visit <http://www.planetguide.net>.



The Down-to-Earth Guide to Global Warming

What is Global Warming? Wacky Weather Explained! Why Extinction Stinks! How YOU Can Change the World!



This essential guide, by Laurie David and Cambria Gordon, will help you understand why global warming happens, how it affects the planet, and the simple steps you can take to get involved in protecting the environment. To preview or order the book, visit the Scholastic website at <http://www.scholastic.com/downtoearth/index.htm>.

The Green - Sundance Channel



The Sundance Channel hosts a weekly television destination dedicated to environmental sustainability called **The Green**. The destination is presented by Robert Redford and hosted by Simran Sethi and Majora Carter. The Green Online presents multimedia content on the earth's ecology and concepts for green living. Their Guide to Greener Living includes information about fuel, home building, cars, clothing, food, sports, and more. The information included in the guide could provide topics for classroom discussion and how individual action can impact global warming. For more information, visit <http://www.sundancechannel.com/thegreen#/greenGuide>.

CREEC Leadership

Region 1—North Coast

Coordinator: **Allison Poklemba**
Phone: 707-445-4321 ext. 104
allisonp@arcatarecycling.org

Region 2—North East

Coordinator: **Dave Ewart**
Phone: 530-225-0267
dewart@shastacoe.org
Coordinator: **Francesca Huntsman-Siemer**
Phone: 530-225-0111
fhuntsman@shastacoe.org

Region 3—Capitol

Coordinator: **Deborah Bruns**
Phone: 530-668-3781
bruns@ycoe.org
Coordinator: **Leslie Smith**
Phone: 530-277-4910
lsmith.tls@gmail.com

Region 4—Bay Area

Coordinator: **Laura Powell**
Phone: 707-685-1805
bacreec@comcast.net

Region 5—South Bay

Coordinator: **Open**
Phone: 805-782-7224
croyer@slococoe.org

Region 6—Delta Sierra

Coordinator: **Tricia Dunlap**
Phone: 209-238-1314
tdunlap@stancoe.org
Coordinator: **Wendy Harrison**
Phone: 209-736-6009
wandw1@comcast.net
Coordinator: **Conni Bock**
Phone: 209-468-9119
cbock@sjcoecoe.net

Region 7—Central Valley

Coordinator: **Manuel Aquino**
Phone: 209-381-5903
maquino@mcoecoe.org

Region 8—Central Coast

Coordinator: **Teresa Lees**
Phone: 805-782-7265
tlees@slococoe.org
Coordinator: **Mary Maranville**
Phone: 805-386-4685, ext 110
mary.maranville@vccrcd.org

Region 9A—SanDCREEC

Coordinator: **Adrienne Marriott**
Phone: 858-292-3733
creec9a@hotmail.com

Region 9B—Orange County

Coordinator: **Helen de la Maza**
Phone: 714-838-8990
Hdelamaza@ocde.us

Region 10—RIMS

Coordinator: **Katharine Havert**
Phone: 909-386-2797
katharine_havert@sbcscs.k12.ca.us
Coordinator: **Jennifer Futterman**
Phone: 909-799-7106
jennifereve111@hotmail.com
Coordinator: **Christie Robinson**
Phone: 760 245-1661 ext. 6101
crobinsor@mdaqmd.ca.gov

Region 11—Los Angeles

Coordinator: **Candice Russell**
Phone: 818-623-4876
crussell@treepeople.org

State Administration

Director: **Celeste Royer**
Phone: 805-782-7224
croyer@slococoe.org

Admin Asst: **Linda Sorensen**

Phone: 805-782-7298
lsorensen@slococoe.org

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