

Teacher Tool 40: Climate Change Study Guide

Study Guide for Environment 10: Climate Change 1 and
Environment 9: Climate Change 2

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Investigating Climate Change

Original Air Date: March 16, 2011

Grade Levels: Climate Change 1 is targeted to grades 7-12; Climate Change 2 is targeted to grades 4-8

Program Description:

The St. Louis Science Center's exhibition "Climate Change" examined one of the most urgent scientific and social issues of the 21st century. Through interactive stations and dioramas that interpret the latest research, the exhibit presented evidence that human activity over the last 300 years has dramatically altered the natural world. This program came live from the exhibition space so students have the opportunity to see parts of the exhibition as they learn from both the exhibit curator and climate change scientist William Dannevik, PhD, Professor of Meteorology and Department Chair, Saint Louis University.

Activities during the program highlight three areas of this important topic:

1. Carbon Footprint—In advance of the program students will be asked to do some home investigation about their family's carbon footprint and bring that data to the program. We'll ask students to share that data and use it in activities as we explore how our carbon footprint impacts the climate.
2. Rising Sea Levels—We'll explore how rising sea levels will affect both humans and animals by looking at two specific examples: the island of Manhattan and polar bears in the Arctic.
3. Alternative Energy Sources—The "Climate Change" exhibition explores a number of alternative energy sources. Students participating will be able to determine which one of the following areas they'll explore in activities during their program: solar power, wind power, nuclear power, or geothermal power.

Program Objectives:

1. The participant will gain a greater understanding about the nature of climate and weather and the difference between the two.
2. The participant will gain knowledge about the effects of their carbon footprint on the environment.
3. The participant will gain knowledge about the relationship between climate change and sea level and potential effects of rising sea levels.
4. The student will explore sources of alternative energy and determine potential strengths and weaknesses of each.
5. The participant will interact with experts involved in climate change.

Program Format:

Student questions and comments are woven into all segments of the program.

1. Welcome and Introduction—Student groups and experts will be introduced and welcomed to the program.
2. Climate vs. Weather—In this short segment, students and experts discuss the difference between the two.
3. Thinking About Carbon Footprint—Students engage in an activity with program experts designed to help them see the impact of seemingly small actions in regard to their carbon footprint. If you'd like your students to engage in a similar activity either before viewing this program archive or as a post-viewing activity, students should go home and fill out Part 1 of the program worksheet included at the end of this document.
4. Thinking About Rising Sea Levels— In this segment we explore how rising sea levels will affect both humans and animals by looking at two specific examples: the island of Manhattan and polar bears in the Arctic. If you'd like your students to engage in a similar activity before viewing this program archive, students should complete Part 2 of the program worksheet included at the end of this document.
5. Alternative Energy Sources—In this segment we focus on alternative sources of energy such as solar power, wind power, nuclear power, or geothermal power.
6. Summary and Closing—We'll summarize the major concepts learned today and seek final questions from students.

Featured National Standards: (Science)

Unifying Concepts and Processes - Unifying concepts and processes help students think about and integrate a range of basic ideas which builds an understanding of the natural world

1. Systems, order, and organization
2. Evidence, models, and explanation

Science as Inquiry - Science as inquiry requires students to combine processes and scientific knowledge with scientific reasoning and critical thinking to develop their understanding of science.

1. Abilities necessary to do scientific inquiry
2. Understandings about scientific inquiry

Life Science - Life science focuses on science facts, concepts, principles, theories, and models that are important for all students to know, understand, and use

3. Interdependence of organisms
5. Diversity and adaptation of organisms

Science and Technology - An understanding of science and technology establishes connections between the natural and designed world, linking science and technology.

1. Abilities of technological design

Featured State Standards (Missouri):

Schools from across the country are invited to join in the program. Missouri state standards are provided for Missouri schools since funding for this program comes from various Missouri organizations.

Missouri Grade Level Expectations

Strand 7: Scientific Inquiry

Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking

Program-Related Activity Suggestions:

1. Thinking About Carbon Footprint—Students should complete Part 1 of the student worksheet included at the end of this document and then compare their results to what they learn about in the archived program.
2. Think About Rising Sea Levels—Students should complete Part 2 of the student worksheet included at the end of this document and then compare their thoughts to what they learn about in the archived program.
3. Have each student journal on what they have learned about climate change, their carbon footprint, rising sea levels and/or alternative sources of energy that they did not know before the program. What did they find most interesting, frustrating, unique, etc. about the topic they choose to write on? Have them share their journal entries with a partner or with the teacher.