

## *Biomes: The Threat of the Sea: Teacher's Guide*

**Grade Level:** 6-8

**Curriculum Focus:** Ecology

**Lesson Duration:** Three class periods

### **Program Description**

The threat of global warming makes the Arctic particularly vulnerable to rising sea levels. Trail scientists who are studying the effects of rising waters, and meet people on the front lines whose coastal communities are at risk. Students will see firsthand how rising waters are forcing some people to struggle to save their homes, while others fight to save their entire country. This program has one feature segment.

---

### **Onscreen Questions**

- How will rising global temperatures affect the planet's oceans?
  - What effects are rising tides having on the Pacific island nation of Tuvalu?
  - What are the main sources of greenhouse gas emissions?
  - Why are the problems associated with global warming long-term?
- 

### **Lesson Plan**

#### *Student Objectives*

- Discuss the causes and effects of global warming.
- Create posters designed to make people see global warming as an urgent issue.

#### *Materials*

- *Biomes: The Threat of the Sea* video and VCR, or DVD and DVD player
- Computer with Internet access
- Poster board, markers, colored pencils, and other materials for creating posters
- Paper and pencil

## Procedures

1. After watching *Biomes: The Threat of the Sea*, ask students to define global warming. (Global warming is the overall rise in the world's temperature caused by an increase in heat-trapping gases in the atmosphere.)
2. On a classroom map, find the three locations featured in the program.
  - Shishmaref, Alaska, United States
  - Tuvalu, Micronesia, South Pacific Ocean
  - New York, New York, United States
3. Ask students to describe how global warming is affecting each location. (Rising sea levels are threatening all, but in different ways: They are eroding the coastline in Shishmaref; they may eventually submerge the island of Tuvalu; and they're wearing away the barrier islands protecting New York City.) Explain that in addition to rising sea levels, higher overall temperatures may lead to storms, drought, floods, and heat waves.
4. Discuss the causes of global warming. Ask students about greenhouse gases and how they are related to global warming. (Greenhouse gases, such as carbon dioxide, trap heat in Earth's atmosphere, and their increase in our atmosphere is contributing to global warming.) What is the source of greenhouse gases? (The gases come from burning petroleum, coal, or natural gas for energy and transportation.) What is the main action that can be taken to slow or stop global warming? (Cut down on emissions of greenhouse gases.)
5. Ask students if the program made them think differently about global warming. If so, how? (Answers will vary, but students may mention the following: It showed the effects of global warming on people and their environment. It made global warming problems seem more real, serious, or urgent.) What parts of the program made the biggest impressions about the seriousness of global warming? (Students may include the stories about people whose lives are directly affected, interviews with the scientists, the shocking images, or the maps and graphs of global warming scenarios.)
6. The students' assignment is to create a poster that will make people see global warming as a serious, urgent issue. Encourage students to consider the information, images, or techniques from the program that made an impression on them. For some, statistics and graphs might have the biggest impact; for others, it may be the pictures or personal stories. The posters can highlight any aspect of global warming, including its causes, effects, or possible solutions. Give students these guidelines.
  - The poster must focus on a specific theme, such as rising sea levels or energy-efficient cars.
  - The message must be stated very clearly.
  - The poster should include at least three pieces of information from the program or independent research



7. Point students to the following Web sites for their research
  - World View of Global Warming  
<http://www.worldviewofglobalwarming.org/>
  - Global Environment: Global Warming  
[http://www.ucsusa.org/global\\_environment/global\\_warming/index.cfm](http://www.ucsusa.org/global_environment/global_warming/index.cfm)
  - Sierra Club: Global Warming  
<http://www.sierraclub.org/globalwarming/>
  - National Resource Defense Council: Global Warming  
<http://www.nrdc.org/globalwarming/gsteps.asp>
  - Global Warming: Undo It: 20 Simple Steps  
[http://www.undoit.org/undoit\\_steps\\_1.cfm](http://www.undoit.org/undoit_steps_1.cfm)
  - Global Warming: Early Warning Signs  
<http://www.climatehotmap.org/index.html>
  - Global Warming: Focus on the Future: What You Can Do  
[http://globalwarming.enviroweb.org/dosomething/dosomething\\_frameset.html](http://globalwarming.enviroweb.org/dosomething/dosomething_frameset.html)
  - EPA Global Warming Site  
<http://yosemite.epa.gov/oar/globalwarming.nsf/content/index.html>
8. When students present their posters, they should briefly describe
  - the primary message,
  - the techniques and information they used to get across their message, and
  - how the poster highlights the serious nature of global warming.
9. Have the class choose five or six posters to hang in a hallway or elsewhere in the school. Encourage students to choose posters that focus on different themes and use different methods to present the point.

### *Assessment*

Use the following three-point rubric to evaluate students' work during this lesson.

- **3 points:** Students participated actively in class discussion about global warming; created a thoughtful poster with a specific theme, clear message, and at least three facts from the program or independent research; made a clear presentation to the class.
- **2 points:** Students participated in class discussion about global warming; created a satisfactory poster with a specific theme, fairly clear message, and three facts from the program or independent research; made an adequate presentation to the class
- **1 point:** Students did not participate in class discussion about global warming; created an incomplete poster that had no specific theme and that included an unclear message and



fewer than three facts from the program or independent research; made an incomplete or sloppy presentation to the class.

## Vocabulary

### **fossil fuel**

*Definition:* A hydrocarbon deposit—petroleum, coal, or natural gas—derived from living matter of a previous geologic time and used for fuel

*Context:* When burned, fossil fuels release carbon dioxide and other heat-trapping gases into the atmosphere.

### **global warming**

*Definition:* Gradual increase of the temperature of Earth's lower atmosphere

*Context:* Many scientists believe that global warming is caused by an increase of heat-trapping gases like carbon dioxide in the atmosphere.

### **greenhouse gas**

*Definition:* A gas such as carbon dioxide that traps heat in the Earth's atmosphere by reflecting radiation

*Context:* Increased greenhouse gases are enhancing the natural "greenhouse effect" and causing global climate change.

## Academic Standards

### **National Academy of Sciences**

The National Science Education Standards provide guidelines for teaching science as well as a coherent vision of what it means to be scientifically literate for students in grades K-12. To view the standards, visit <http://books.nap.edu>.

This lesson plan addresses the following science standards:

- Life Science: Populations and ecosystems
- Science in Personal and Social Perspectives: Populations, resources, and environments; Science and technology in society
- Physical Science: Properties and changes of properties in matter

### **Mid-continent Research for Education and Learning (McREL)**

McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education addresses 14 content areas. To view the standards and benchmarks, visit <http://www.mcrel.org/>.

This lesson plan addresses the following national standards:

- Science—Life Sciences: Understands relationships among organisms and their physical environment
- Language Arts—Viewing: Uses viewing skills and strategies to understand and interpret visual media; Writing: Gathers and uses information for research purposes



- Life Skills – Thinking and Reasoning: Understands and applies the basic principles of presenting an argument

### The National Council for the Social Studies (NCSS)

NCSS has developed national guidelines for teaching social studies. To become a member of NCSS, or to view the standards online, go to <http://www.socialstudies.org>

This lesson plan addresses the following thematic standards:

- People, Places, and Environments
  - Science, Technology, and Society
- 

## Support Materials

Develop custom worksheets, educational puzzles, online quizzes, and more with the free teaching tools offered on the Discoveryschool.com Web site. Create and print support materials, or save them to a Custom Classroom account for future use. To learn more, visit

- <http://school.discovery.com/teachingtools/teachingtools.html>
- 

## DVD Content

This program is available in an interactive DVD format. The following information and activities are specific to the DVD version.

### How To Use the DVD

The DVD starting screen has the following options:

**Play Video** – This plays the video from start to finish. There are no programmed stops, except by using a remote control. With a computer, depending on the particular software player, a pause button is included with the other video controls.

**Video Index** – Here the video is divided into four parts (see below), indicated by video thumbnail icons. Watching all parts in sequence is similar to watching the video from start to finish. Brief descriptions and total running times are noted for each part. To play a particular segment, press Enter on the remote for TV playback; on a computer, click once to highlight a thumbnail and read the accompanying text description and click again to start the video.

**Curriculum Units** – These are specially edited video segments pulled from different sections of the video (see below). These nonlinear segments align with key ideas in the unit of instruction. They include onscreen pre- and post-viewing questions, reproduced below in this Teacher's Guide. Total running times for these segments are noted. To play a particular segment, press Enter on the TV remote or click once on the Curriculum Unit title on a computer.



**Standards Link**—Selecting this option displays a single screen that lists the national academic standards the video addresses.

**Teacher Resources**—This screen gives the technical support number and Web site address.

## **Video Index**

### **I. The Frontlines (14 min.)**

Rising sea levels have had a profound impact around the world. Investigate the increasing dangers of high water in Tuvalu, Alaska, and New York.

### **II. Higher Ground (9 min.)**

What would you do if your state or country were in danger of disappearing? See how the people of Alaska and Tuvalu are coping with global warming.

### **III. Energy and Industry (7 min.)**

A wide variety of human activities lead to the emission of greenhouse gases. Learn why we need to think decades, and even centuries, in advance.

### **IV. Out of Time (17 min.)**

Responsible for most greenhouse emissions, industrialized nations aren't suffering the biggest consequences. See the effects of global warming in Tuvalu.

## **Curriculum Units**

### **1. Protection From the Storm**

*Pre-viewing question*

Q: What is erosion?

A: The process by which something is gradually worn away or destroyed

*Post-viewing question*

Q: If global warming continues, how will life in Alaska change?

A: Answers will vary.

### **2. Surrounded by Sea**

*Pre-viewing question*

Q: Why is rising water a threat to low-lying islands?

A: Answers will vary.

*Post-viewing question*

Q: What do you think it's like to watch your island slowly disappear?

A: Answers will vary.



### 3. New York's Fears

*Pre-viewing question*

Q: What are barrier islands?

A: Big chunks of sand that protect inland areas from storms and tidal shifts

*Post-viewing question*

Q: What will happen if the barrier islands protecting New York City erode?

A: Answers will vary.

### 4. Changing Patterns

*Pre-viewing question*

Q: In recent years, how have weather patterns in your area changed?

A: Answers will vary.

*Post-viewing question*

Q: What is the biggest concern about New York's changing weather patterns?

A: Answers will vary.

### 5. Problems on Tuvalu

*Pre-viewing question*

Q: Do you think Tuvalu will disappear into the ocean?

A: Answers will vary.

*Post-viewing question*

Q: How have rising sea levels affected Tuvalu's plant growth?

A: It is getting difficult to grow plants because there is too much salt water in much of the ground.

### 6. A New Village

*Pre-viewing question*

Q: If you were forced to abandon your town or city, how would you feel?

A: Answers will vary.

*Post-viewing question*

Q: Who should pay for the village relocation?

A: Answers will vary.

### 7. Fossil Fuels

*Pre-viewing question*

Q: What human activities create environmental problems?

A: Answers will vary.

*Post-viewing question*

Q: Which activities produce the most greenhouse gas emissions?

A: The burning of coal, oil, and natural gas that power our society



## 8. Concern for the Future

*Pre-viewing question*

Q: Is global warming a real concern?

A: Answers will vary.

*Post-viewing question*

Q: What are your biggest fears about global warming?

A: Answers will vary.

## 9. Moving Time

*Pre-viewing question*

Q: Will Alaska's climate ever be drastically different?

A: Answers will vary.

*Post-viewing question*

Q: Would you feel safe in a house that had to be moved back from the shore several times a year?

A: Answers will vary.

## 10. Tuvalu and the UN

*Pre-viewing question*

Q: How is it right that Tuvaluans must adapt to a new climate?

A: Answers will vary.

*Post-viewing question*

Q: Why have Tuvalu's problems been widely ignored by the global community?

A: Answers will vary.

## 11. A Vulnerable Nation

*Pre-viewing question*

Q: Does global warming affect developing nations more than industrialized ones?

A: Answers will vary.

*Post-viewing question*

Q: What can you do to curb global warming?

A: Answers will vary.

## 12. Responsibilities and Actions

*Pre-viewing question*

Q: What should industrialized nations be doing to reduce global warming?

A: Answers will vary.

*Post-viewing question*

Q: Who should bear the responsibility for combating global warming?

A: Answers will vary.

