

Biomes: Action for a Healthy Planet Unit Plan

Title: Biomes: Action for a Healthy Planet

Description: Student activists explore the biomes of the world and develop a campaign to increase public awareness to assure protection of biome health.

At a Glance

Grade Level: 9–10

Subject sort (for Web site index): Science

Subject(s): Biology

Topics: Ecology, Ecosystems, Habitat, Biomes

Higher-Order Thinking Skills: Generalizing, Decision Making, Analysis

Key Learnings: Understanding Ecosystems and Biomes, Human Environmental Impact, Environmental Policy

Time Needed: 4 weeks, 1 hour per day

Unit Summary

Students become environmentalists and work in groups to develop solutions to contemporary environmental problems. Student groups research the features of a specific biome and then investigate human impact and its harmful effects on the biome. Finally, students analyze the problems and use scientific understanding to develop solutions to human encroachment. The solutions are presented to the class in multimedia formats.

Curriculum-Framing Questions

- **Essential Question**

What can I do to affect the future?

- **Unit Questions**

How are biomes changing because of human behavior?

How can we lessen the human impact on the world's biomes?

- **Content Questions**

What are the Earth's biomes?

What are the characteristics of the different biomes?

What are the relationships among organisms in a biome?

What are the relationships among living and nonliving things in a biome?

Assessment Processes

View how a variety of student-centered [assessments](#) are used in the Biomes: Action for a Healthy Planet Unit Plan. These assessments help students and teachers set goals; monitor student progress; provide feedback; assess thinking, processes, performances, and products; and reflect on learning throughout the learning cycle.

Instructional Procedures

Research Activities

Day 1

Begin the unit by asking the class the Essential Question, *What can I do to affect the future?* Record student answers on a chart (which will be brought out again at the end of the unit).

After students have responded to the Essential Question, tell them that in the upcoming unit they will be making decisions about the future of the world by playing the role of environmentalists. As environmentalists, their task will be to investigate threats to various biomes in the world and propose solutions to the threats.

Introduce the concept of biomes with the [Biomes Introduction](#) slideshow that gives an overview of the upcoming research project. Introduce the [unit rubric](#) to students so they are aware of project expectations right from the beginning. Allot time to discuss the expectations, and answer any questions.

Discuss the requirements of the slideshow research assignment using the [slideshow scoring guide](#). Because the class will be working in groups, remind students that each member of the group should contribute to the upcoming projects, and that each person's responsibilities within the group should be well-defined for each project. Hand out the [group process rubric](#) and discuss team expectations. Remind students to refer to the rubric as they work together to assess their own collaboration skills as well as those of their team members.

Form eight biome groups and begin by using the [biome brainstorming chart](#) to brainstorm what students know about their biomes. (Note: The desert biome is not assigned, because it is used as a teaching example throughout the unit.)

Days 2

Using the Internet and other resources, have groups study their biomes. Next, tell students to use the [human impact brainstorming chart](#) to predict and record ideas about the influence human habitation and resource use has on the biomes. (This topic is studied in-depth during Days 8 and 9.)

The Slideshow Activities—The Overview

Days 3 and 4

Show students the [Desert Student Sample](#). This presentation teaches about one biome, the desert, and serves as a model for the quality and depth of work expected of students. Have groups create a slideshow presentation on their biome, using the [slideshow scoring guide](#) as a guide.

Days 5 and 6

Provide time for groups to deliver their slide presentations to the class. Peers provide peer feedback to each group on science content, presentations skills, and slideshow elements using the [slideshow scoring guide](#). After each presentation, members hold a brief class discussion to receive feedback and take suggestions for improving their presentations. Advise students to take notes during the presentations so they will be prepared for the final test covering information on all of the biomes.

Day 7

Allow groups to review feedback and complete the [slideshow scoring guide](#) to improve their slideshows for final grading.

The Web Page Activities—The Problem

Days 8 and 9

Ask students the Unit Question, *How are biomes changing because of human behavior?* Hold a class discussion around this question.

Using the [human impact brainstorming chart](#), have students begin studying the impact humans have on the health of biomes. Have students use Internet resources and print materials to find credible evidence of human effects. Review the brainstorming charts to assess student understanding of the concepts. Hold small group conferences with groups that may be having trouble grasping the concepts and redirect teaching as needed.

Have students use the notes from their research to create informational Web pages. (Note: Solutions may be developed during this study, so notes for *The Solution* newsletter in the next project can be taken concurrently.)

Day 10

Have students present their Web pages to the class. After each presentation, hold a brief discussion, with questions for presenters, suggestions for aiding the biome, and ideas for improving the Web pages. Again, have students take notes on all of the biome presentations in preparation for the final test.

The Newsletter Activities—The Solution

Day 11

Ask students the Unit Question, *How can we lessen the human impact on the world's biomes?* Tell students they will be investigating the answer to this question in their next project.

In response to earlier studies and discussions, biome groups identify major environmental problems in their biomes (such as desertification) and research solutions. Have groups investigate the impacts on human life that would occur if the proposed solutions were implemented.

Present a [sample newsletter](#) to students. Pass out the [newsletter scoring guide](#) to help guide student work. Check for student understanding and answer any questions. Have students use the [biomes graphic organizer](#) to help outline their newsletters.

Days 12 and 13

Have students complete their research and develop newsletters.

Days 14 and 15

Provide time for groups to present their newsletters to the class. Groups explain the problem, the solution they recommend, evidence to support their reasoning, and the subsequent effect on human life. Have students take notes on each presentation.

Days 16 and 17

Tell each group to create five quiz questions that cover general information about the biome they presented. Have each group include answer keys with their submissions. Combine the group quizzes to create a "Biomes of the World Test," which is administered as a final assessment.

After students take the test, revisit the Essential Question, *What can I do to affect the future?* Post the chart from the beginning of the unit and ask students to discuss their new understandings regarding this important question.

Prerequisite Skills

- Experience using multimedia software
- Research skills using print and electronic resources
- Expository writing
- Basic knowledge of ecological principles (such as interdependency, food web, habitat, and so forth)

Differentiated Instruction

Resource Student

- Modify work requirements while maintaining depth
- Provide support by enlisting the help of teaching assistants, parents, and student helpers
- Provide support by helping the student make a daily "to do" list
- Provide extra time to complete activities (possibly during resource classes)
- Assign a well-defined task the student can do well that contributes to the overall group project
- Modify note-taking methods, graphic versus written assignments, paired note taking, audio taping, and text-to-speech translation for Internet work
- Write key vocabulary words for all students to copy

Gifted Student

- Encourage the student to study more in-depth topics, such as human impact over time (such as desertification) or biomes over geologic time (such as ice ages)

English Language Learner

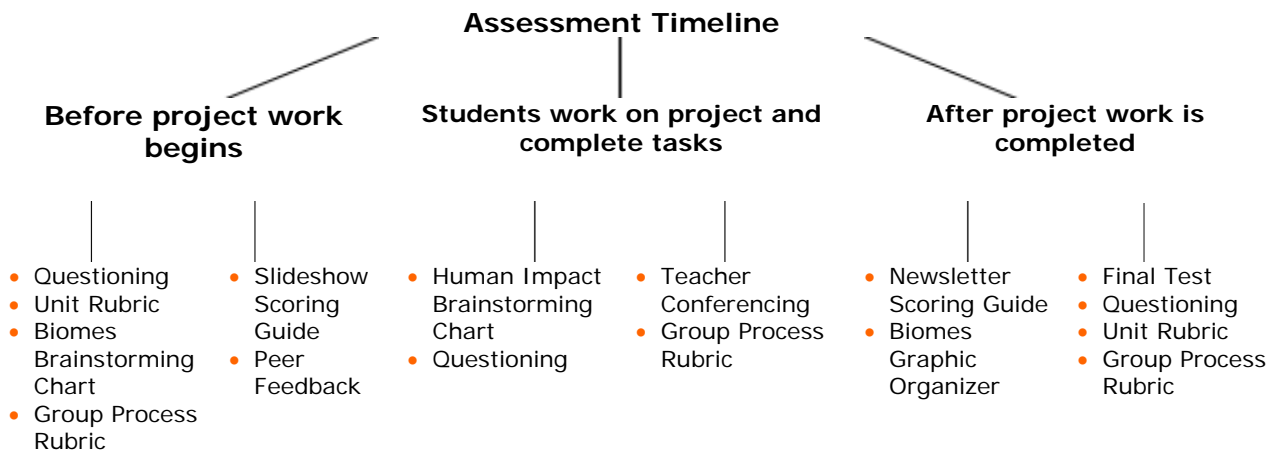
- Provide visual models when possible
- Seek translation help from more proficient bilingual students or adults
- Ask support personnel to develop a two-language glossary of terms to aid vocabulary development
- Allow the student to write in the student's first language for later translation

Credits

Audrey Richards participated in the Intel® Teach Program, which resulted in this idea for a classroom project. A team of teachers expanded the plan into the example you see here.

THINGS YOU NEED (highlight box)

Assessment Plan



Informally assess students using questioning, peer feedback, and teacher conferencing. Provide the [slideshow scoring guide](#), [newsletter scoring guide](#), and [unit rubric](#) to help students self-assess their work on the slideshow and newsletter projects. Have students use the [group process rubric](#) to self-assess and provide feedback to their peers on group collaboration skills. Review [the human impact brainstorming chart](#) to assess students' ability to predict and show understanding of the impact humans have on the health of their group's biome. Schedule teacher conferences with groups periodically to assess student understanding and redirect teaching as needed. Administer a final test based on all groups' research and projects. Use the [unit rubric](#) to assess all aspects of the unit.

Content Standards and Objectives

Targeted Utah Content Standards and Benchmarks

Science: Biology—Secondary Schools

- Predict how changes in one part of an ecosystem affect the system
- Describe symbiotic relationships within an ecosystem
- Relate natural selection to changes in an ecosystem
- Analyze the influence of humans on an ecosystem
- Investigate and discuss career opportunities that have a direct impact on the environment
- Predict long-range environmental impacts of specific practices and policies

Student Objectives

Students will be able to:

- Understand the characteristics of the biomes on the Earth today
- Recognize the relationships of organisms to their environments
- Understand the effect of humans on the biomes
- Define career opportunities within biomes
- Analyze an environmental problem and develop solutions using scientific explanations

- Use the Internet and production software (such as slideshow and desktop publishing programs) to create meaningful presentations about biomes, interdependency, and protection of the biomes

Resources

Materials and Resources

Printed Materials

- Library books about ecology, climate, and geography

Internet Resources

- A Research Guide for Students
<http://www.aresearchguide.com/biomes.html>*
Student developed informational pages about each biome
- Hawaiian Ecosystems at Risk Project (HEAR)
www.hear.org*
Information about biomes in Hawaii and environmental problems facing the islands
- Radford University Biomes Page
www.runet.edu/~swoodwar/CLASSES/GEOG235/biomes/intro.html*
Information about each biome with some detailed scientific information
- Franklin Institute: Ecosystems, Biomes, and Habitats
www.fi.edu/tfi/units/life/habitat/habitat.html*
Definitions and activities about ecological terms

Technology—Hardware

- Computer to create presentations and conduct research
- Internet connection to conduct research
- Printer to print newsletters
- Projection system to show presentations
- Scanner to scan pictures for presentations

Technology—Software

- Desktop publishing to create newsletters
- E-mail to converse with experts
- Encyclopedia on CD-ROM for conducting research on biomes
- Image processing to work with images for presentations
- Internet Web browser for conducting research
- Multimedia to develop slideshows
- Web development to create Web pages
- Word processing to take notes during research