

**Time:**

(1) 45 minute session in the classroom

(1) 45 minute session doing fieldwork (plus travel time)

Level:

Grades 4-6

Standards selected for grade 4

Goals:

This lesson will provide students a hands-on opportunity to understand the importance of different biomes to a community, as well as the effects of dumping toxic waste into streams and rivers.

Objectives:

Students will be able to

1. Identify the difference in a Stream and River Biome versus a Boreal Forest Biome
2. Recognize how these two Biomes are interdependent
3. Explain how Biomes affect other Biomes

Materials listed with each individual activity.

Explore Utah's Biomes

by Dane Hepworth, Neicca Butts, and Mark Larese-Casanova

Correlations to Core Curriculum:**4th Grade**

- Standard 5: Students will understand the physical characteristics of Utah's wetlands, forests, and deserts and identify common organisms for each environment.
 - Objective 1: Describe the physical characteristics of Utah's wetlands, forests, and deserts.
 - Indicator c: Locate examples of areas that have characteristics of wetlands, forests, or deserts in Utah

Background Information:What is a Biome?

A biome is a large naturally occurring community of flora and fauna occupying a major habitat, and is sometimes referred to as an 'ecoregion'. They are defined by factors such as plant structures, (trees, shrubs, grasses), leaf types (broadleaf and needle leaf), plant (forest, shrubland, grassland), topography (mountains, flat basins) and climate. "Biomes are the world's major communities, classified according to the predominant vegetation and characterized by adaptations of organisms to that particular environment" (N.A. Campbell). We all live within a biome that is inhabited by plants and other animals, and it is important to consider how our actions affect the other residents of our biome.

Five Major Biomes (Subdivided)

- Aquatic→Freshwater→Lakes and Ponds, Streams and Rivers and Wetlands. Marine→Ocean, Coral Reefs, and Estuaries
- Desert→Hot and Dry, Semiarid, Coastal, and Cold Deserts
- Grasslands→Savannah and Temperate Grasslands
- Forest→Tropical, Temperate, and Boreal (taiga) Forests
- Tundra→Arctic and Alpine Tundra

Materials:

Supplies –

- Science journals
- Writing utensils
- Poster paper (1 per group)
- Markers, any other supplies needed for poster creation

Equipment--

- Internet access
- Ecoregions of Utah poster (found at http://www.epa.gov/wed/pages/ecoregions/ut_eco.htm)
- Projector
- Whiteboard

Did you know?

Millions and millions of years ago, the first forests were dominated by giant horsetails, club mosses, and ferns that stood up to 40 feet tall.

Materials:

Lessons and Activities:

Day 1 --

Engage (10 minutes) – To introduce the topic of biomes, show students the short video clip “Biomes,” from a Scholastic StudyJam.

<http://studyjams.scholastic.com/studyjams/jams/science/ecosystems/biomes.htm>

The clip time is slightly over 4 minutes long.

Discuss what students thought was interesting from the video clip. Ask students, “What biome do we live in?” Allow students to discuss factors which indicate which biome they live in.

Explore (20 minutes) – Share the Ecoregions of Utah poster with students, either electronically or in printed form:

http://www.epa.gov/wed/pages/ecoregions/ut_eco.htm

Have students break into groups of 3-5 and explore a major ecoregion of Utah. For each ecoregion, have the students collect the following information:

- Ecoregion name
- Location in Utah
- General topography
- Climate characteristics
- Major plant communities
- 2-3 common plants and animals

Have each student group write a short report with an illustration or two for their ecoregion/biome. If desired, you may have the students present their reports to the class.

Explain (15 minutes) – Discuss as a class insights gained during the biome activity. Ask students to name various biomes, and list them on the board.

Elaborate (5 minutes) – Have students write in their science journal which biome they would prefer to live in and why. Ask students to list at least three advantages of living in that biome.

Day 2 –

Engage (10 minutes) – Ask the question, “Do biomes ever affect each other? For instance, could a desert and forest biome ever

Supplies –

- Biome worksheets (attached at the end of the lesson plan)
- Science journals
- Pencils

Equipment--

- Topographical maps (9, or enough for one per group)
- Highlighters/markers (2 different colors per group)

Did you know?

Today, forests occupy approximately one-third of Earth's land area, account for over two-thirds of the leaf area of land plants, and contain about 70% of carbon present in living things.



<http://www.ucmp.berkeley.edu/glossary/gloss5/biome/forests.html>

overlap?" Have students thoughtfully respond to the question in their science journal, and then discuss as a class.

In preparation for fieldwork, separate students into groups of 4 people each. Make sure students bring their topographical maps, their Biome worksheets, their science journals, and a pencil.

Travel to a nearby biome.

Explore (25 minutes) – Using the topography worksheet, as well as visual recognition, the groups should determine at least 2 biomes in the area. With two different colors, the group will highlight two biomes on the topography map and label the biomes. Using another color, the group should identify a riparian area for the Stream and River Biome (if this biome is present)

Individually, each student should draw, as best they can, the two biomes and the riparian area with the river down the middle in their science journals. After their sketch is finished, they should individually *or* as a group answer the questions from the 'Biome worksheet.'

Explain (10 minutes) – Before leaving the area, a class discussion should be held on what biomes were observed, how students identified the biomes, and any questions that students came up with. In addition, the worksheet should be reviewed as a class.

Assessment:

The topographical maps of each group must have full names of all students and have the two Biomes highlighted. The students will hand in their lab notebooks and Biomes Worksheet. Student notebook grading is based upon if the notebooks contain drawings of the two biomes, the river, the riparian area (if present), and the worksheet questions.

A rubric for this assessment can be found at the end of the lesson plan.

Extensions:

- For a quick quiz to see how students are doing, you may choose to have students take the quiz from the Scholastic StudyJam. The quiz is 7 questions long, and focuses on the information discussed in the biomes video clip. The quiz can be found [here](#).

Did you know?

There are more than a dozen ways to classify biomes. Climatologists, botanists, ecologists, biologists, and anthropologists have different criteria for deciding what constitutes a biome. One of the simplest classification systems has only two biomes: terrestrial (land) and aquatic (water). One of the most complicated has more than a dozen.

http://education.nationalgeographic.com/education/encyclopedia/biome/?ar_a=1

- Have students explore the biomes of the world using the website '[The Wild Classroom.](#)' This website allows students to click on the biomes throughout the world to see interesting facts, photos, stories, and informative videos. This is an interactive experience that students can do on their own or in partners. This website also includes lesson plans for teachers to further extend their unit on biomes!

Resources:

Books

- *Utah Master Naturalist Mountains Textbook*
http://extension.usu.edu/utahmasternaturalist/files/uploads/UMNP_Mountains_Text.pdf
- *Utah Master Naturalist Deserts Textbook*
http://extension.usu.edu/utahmasternaturalist/files/uploads/UMNP_Deserts_Text.pdf
- *Utah Master Naturalist Watersheds Textbook*
http://extension.usu.edu/utahmasternaturalist/files/uploads/UMNP_Watersheds_Text.pdf
- *What is a Biome?* by Bobbie Kalman
- *Many Biomes, One Earth* by Sneed B. Collard III
- *Amazing Biome Projects You Can Build Yourself* by Donna Latham
- *Biomes and Ecosystems* by Barbara J. Davis

Websites

- Ecoregions of Utah Map
http://www.epa.gov/wed/pages/ecoregions/ut_eco.htm
- Scholastic video clip and short quiz on biomes --
<http://studyjams.scholastic.com/studyjams/jams/science/ecosystems/biomes.htm>.
- Interesting biome facts (and more lesson plans!) --
<http://www.thewildclassroom.com/biomes/index.html>
- Kid friendly information on biomes (great photos and interesting facts) --
<http://www.kidsdiscover.com/spotlight/biomes-for-kids/>
- Information on Forests: Defenders of Wildlife --
<http://www.defenders.org/forest/basic-facts>
- U.S. Forest Service -- <http://www.fs.fed.us/>

Name _____

Date _____

Biomes Fieldwork

1. Identify one biome type that you see.
2. How did you identify this biome?
3. List three plants and animals in this biome.
4. What is another biome you see?
5. How did you identify this biome?
6. List three plants and animals in this biome.
7. How do these two biomes interact?
8. List everything you can think of that would be affected if someone leaked toxic waste in these biomes (at least 5 things).

Utah's Biomes Experience Rubric

Student has drawn scientific sketches of the two biomes he saw. <i>(10 points)</i>	Student has drawn scientific sketches of one of the two biomes he saw. <i>(5 points)</i>	Student has not drawn scientific sketches of the biomes he saw. <i>(0 points)</i>
Student has drawn a scientific sketch of the river and riparian area, if applicable. <i>(10 points)</i>	Student has drawn a scientific sketch of the river OR riparian area, if applicable. <i>(5 points)</i>	Student has not drawn scientific sketches of the river or riparian area, if applicable <i>(0 points)</i>
The worksheet is completed, and correct answers have been given <i>(10 points)</i>	The worksheet is completed or mostly completed, and correct answers have been given for at least 4 of the 7 questions <i>(5 points)</i>	The worksheet is not near completion, and students have 3 or less correct answers <i>(0 points)</i>
The topographical map turned in has all of the student names that were in a group together, and 2 biomes are highlighted on the map <i>(10 points)</i>	The topographical map turned in has all of the student names that were in a group together, and at least 1 biome is highlighted on the map <i>(5 points)</i>	The topographical map is missing student names, has no highlighted biomes, or was not turned in <i>(0 points)</i>

Student Name:

Score: /40