

## BIOME SWEET BIOME

**Master Teacher:** Nancy Long

**Grade level:** 5-8

**Time allotment:** five 45-minute class periods

**Overview:** In this lesson students will identify the biomes of the world and locate them on a map. They will learn how some animals and plants are adapted for survival in their biome.

**Subject matter:** Science

Biome locations

Biome characteristics

Adaptations for survival

Basic needs of living things

**Learning objectives:**

The student will:

Name and locate the nine major biomes of the world.

Describe the climate of each biome.

List animals and plants found in each biome.

Describe the adaptations for survival of at least one animal in each biome.

**Standards: Texas Essential Knowledge and Skills** (located at <http://www.tea.state.tx.us/rules/tac/ch112.html#s11222>)

(5.9) **Science concepts.** The student knows that adaptations may increase the survival of members of a species. The student is expected to:

(A) Compare the adaptive characteristics of species that improve their ability to survive and reproduce in an ecosystem;

(B) Analyze and describe adaptive characteristics that result in an organism's unique niche in an ecosystem; and

(C) Predict some adaptive characteristics required for survival and reproduction by an organism in an ecosystem.

(5.10) **Science concepts.** The student knows that likenesses between offspring and parents can be inherited or learned. The student is expected to:

(B) Give examples of learned characteristics that result from the influence of the environment.

(6.12) **Science concepts.** The student knows that the responses of organisms are caused by internal or external stimuli. The student is expected to:

(C) Identify components of an ecosystem to which organisms may respond.

(7.12) **Science concepts.** The student knows that there is a relationship between organisms and the environment. The student is expected to:

(A) Identify components of an ecosystem;

(C) Describe how different environments support different varieties of organisms

(8.6) **Science concepts.** The student knows that interdependence occurs among living systems. The student is expected to:

(C) Describe interactions within ecosystems

## Media Components:

ITV series *Real World Science* # 103 "Habitats"

Websites listed below are incorporated into a hotlist at the website

<http://www.kn.pacbell.com/wired/fil/pages/listbiomesna.html>

**Introduction to Biomes** is an excellent site with links for seven biomes (the aquatic biomes are treated as one). Extensive information about adaptations for survival, food webs, and energy pyramids makes this a good starting point for research.

<http://curriculum.calstatela.edu/courses/builders/lessons/less/biomes/introbiomes.html>

**Biomes** is a set of WebPages developed by approximately seventy 9th grade students at Thurston High School in Springfield, Oregon in 1997. This was an integrated Science, Literature, and Health project. There are three links for each biome, each one developed by a different group of students. Every link has information and pictures related to plants, animals, climate, and health concerns.

<http://ths.sps.lane.edu/biomes/index1.html>

**Cyberzoo** is a good source for lists of the animals of each biome, including scientific and common names.

<http://lsb.syr.edu/projects/cyberzoo/biome.html>

**Biomes, Habitats, and Ecoregions** is a site developed by Nearctica. It has links to all land biomes and numerous links to information on wetlands. It is, however, a commercial site complete with advertising banners.

<http://www.nearctica.com/ecology/habitats/ehabitat.htm>

**The Evergreen Project** has links for land biomes. Questions are on the left side of each page. Oriented toward the elementary school student, this page has links to the Ask Jeeves Road Scholars pages.

<http://mbgnet.mobot.org/sets/index.htm>

**Biome Basics**, a site developed by education students at the University of Richmond, has links for seven biomes (the freshwater biome is not represented) with information on plants, animals, climate, and interesting facts for each biome.

<http://www.richmond.edu/~ed344/webunits/biomes/biomes.html>

**Materials:**

World map with biome key (one per student)

Map colors or crayons (one set per one or two students)

TV and VCR with remote control

Computers (up to one per student)

11 x 17 white paper or construction paper (one sheet per student)

Scissors (one pair per one or two students)

Glue (one container per one or two students)

Notebook paper (8 sheets per student; may be provided by the students)

**Prep for Teachers:** Before the lesson begins, the teacher should bookmark the link for the hotlist

<http://www.kn.pacbell.com/wired/fil/pages/listbiomesna.html>

on each computer to be used by students. The videotape should be cued up to beginning of the segment on Habitats. Maps and map colors or crayons should be ready to distribute.

## Introductory Activity: Setting the Stage

Step 1: Begin the lesson by asking students the question, "What's it like where we live?" Discuss the climate, terrain, plants, and animals found in the local region. Introduce the word **biome** and explain that a biome is a region of the world that has a certain set of characteristics, such as climate and living things. Introduce the word **adaptations** and explain that adaptations are gradual changes over many generations that enable plants and animals to survive in the biome where they live. Introduce the word **habitat** and explain that a habitat is a specific area where an animal or plant lives within a biome. Tell students they are going to learn about the biomes of the world by watching a video called **Habitats**, and that in this video the word habitats is used to mean biomes.

Step 2: Distribute world maps and map colors or crayons to each student. Tell students they will be identifying each biome by outlining and coloring the regions on their map as they view the video. **Focus for Media Interaction:** To give students a specific responsibility while viewing, **say**, "Let's watch the first part of our video to find out what all living things need to survive."

## Learning Activities

Step 1: **Begin** the video where the girl in the yellow sweater says, "Hi. I'm Cassie. Welcome to Real World Science." **Pause** the tape after the musical notes just after the giant tortoise walks across the screen and the narrator says, "Some animals carry their shelter around with them." Ask students, "What things do all living things need to survive?" (Food, water, air, and space). Ask students to give examples of how some animals find shelter. (Some animals hide under rocks; some live in caves; some climb trees; go underwater; some burrow in the ground; some carry their shelter around with them.) **Say**, "In the next segment, watch to see where the polar regions are located."

Step 2: **Resume** the video. **Pause** it on the picture of the map showing the polar regions, after Cassie has said "...and to the very southern part of the world, the South Pole."

Have students mark the polar regions on their map. They should color the North Pole and South Pole areas the same color and should indicate the color used by making a dot of that color after the biome name in the key at the bottom of the map.

**Say**, "Now let's watch to find out about the adaptations that help some animals survive in the polar regions."

Step 3: **Resume** the video. **Pause** it after the musical notes after the picture of the penguins, when Cassie says, "....and must swim to find food."

Ask students to describe the animal adaptations mentioned. (Thick fur, blubber, and swimming to find food) **Say**, "Now let's find out about the next biome, the tundra. Watch to see where the tundra is on your map."

Step 4: **Resume** the video. **Pause** it on the map picture after Cassie says, "...and northern Asia." Have students color the tundra area on their maps, using a different color than they did for the polar regions and marking the color in the map key.

**Say**, "Now let's watch to see what kinds of plants and animals live in the tundra."

Step 5: **Resume** the video. **Pause** it after the picture of the white rabbit when Cassie says, " .....to blend in with the ice and snow to protect him from predators."

Have students name the plants (mosses, grasses, dwarf shrubs) and animals (caribou, seals, penguins, brown bears, birds) that live in the tundra. Ask how the arctic hare is adapted for survival there. (Its fur changes from brown in summer to white in winter to help it hide from predators). **Say**, " The next biome we will learn about is the desert. Let's see where the world's deserts are located."

Step 6: **Resume** the video. **Pause** it on the map picture after Cassie says, "...Africa, Asia, and Australia." Have students color the desert areas of the world on their maps and mark the color in the key, using a new color. **Say**, "What are deserts like?" Ask students to tell what they think. **Say**, "Let's see if we were correct."

Step 7: **Resume** the video. **Pause** it after the picture of the lizard when Cassie says, "You'll also find a wide variety of lizards that have adapted to the harsh living conditions of the desert." Ask students to name ways in which plants and animals have adapted to desert life. (Storing water, coming out at night) **Say**, "The next biome we will look at is grasslands. Let's find out where they are."

Step 8: **Resume** the video. **Pause** it on the map picture with the grasslands marked in yellow after Cassie says, "...South America, Africa, Europe, Asia, and Australia too." Have students color the grasslands and mark the key with the new color used for grasslands. **Say**, " Now let's see what lives in the grasslands."

Step 9: **Resume** the video. **Pause** it after the picture of the lions when Cassie says, "...and fierce predators like lions." Ask students why there are few trees in the grasslands. (There is not enough rain.) Ask them to name animals that live in grassland areas of the world. (bison, wallabies, elephants, rhinos, wildebeests, rabbits, lions).

**Say**, " Now let's move on to the forests of the world. How many different kinds of forests do you think there are?" (Three) "The first kind of forest we'll visit is the coniferous forest. Watch to find out where these forests are located."

Step 10: **Resume** the video. **Pause** it on the map picture with the coniferous forests colored in purple after Cassie says, "...parts of northern Europe, and

northern Asia." Have students color the areas on their maps and mark their answer keys.

**Say**, "Now watch to find out what lives in the coniferous forests."

Step 11: **Resume** the video. **Pause** it after the moose picture when Cassie says, "the largest animal in the deer family." Ask students what are the characteristics of coniferous trees. (Needles instead of leaves, seeds found in cones) Ask them to name some animals that live there. (mice, squirrels, foxes, beavers, birds, moose) **Say**, "Watch to see how the temperate forest is different from the coniferous forest."

Step 12: **Resume** the video. **Pause** it on the map picture where the temperate forests are colored green after Cassie says, "Europe, Asia, Africa, and Australia too." Have students color their maps and mark their map keys. **Say**, "Let's watch for characteristics of the temperate forest."

Step 13: **Resume** the video. **Pause** it after the picture of the black bear walking when Cassie says, "Animals like bears sleep, or hibernate, through the winter." Ask the following questions: "What seasons does the temperate forest have?" (spring, summer, autumn, winter) "What are deciduous trees? (trees that shed their leaves in winter) "What adaptations have animals made for life in the four seasons of the temperate forest?" (Finding food in any season, storing food for the winter, migrating, hibernating)

**Say**, "What's the last kind of forest?" (rainforest) "Let's watch to find out where the rainforests are."

Step 14: **Resume** the video. **Pause** it on the map picture where the rainforests are colored orange after Cassie says, "South America, Africa, Malaysia, and Australia." Have students color the areas on their maps and mark their map keys.

**Say**, "Now watch to see what is unusual about the plants and animals of the rainforest."

Step 15: **Resume** the video. **Pause** it on the picture of the blue and black butterfly after Cassie says, "...including one of the largest populations of butterflies." Ask students to name some unusual features of rainforest plants and animals. (Large leaves, bright colors, largest insect population in the world) **Say**, "Now let's look at the water biomes of the world. Watch to see what the two kinds of water biomes are."

Step 16: **Resume** the video. **Pause** it after the picture of the manatee when Cassie says, "...and great big manatees." Have students color the remainder of their maps to represent water and mark their map key with that color. Ask them to name some animals that live in water. (fish sharks, snakes, seahorses, manatees)

### **Culminating Activities:**

Step 1: Give every student glue and a piece of 11 x 17 white paper or construction paper. Have them glue their maps in the center of the paper, leaving a one-inch margin at the top. Explain that they will be using the Internet to research information on each type of biome. They are to find the following information for each biome:

Annual rainfall

Temperature range and average

Type of landscape

Typical plants

Typical animals

The information for each biome is to be written in a two-inch by two-inch box (either drawn on the area outside the map or cut from white paper and pasted on the area outside the map). Allow students to use the computers to access the website bookmarked before the start of the lesson,

<http://www.kn.pacbell.com/wired/fil/pages/listbiomesna.html>

From there they may go to any of the six websites included in the hotlist to get the information about each of the biomes. If handwriting the information, students may choose to color-code it to correspond with the colors used on the map for each biome.

**\*Note:** Students who have Internet access at home may finish this part of the assignment outside of class. Information written in the squares should be evenly spaced around the outside edge of the colored world map on the larger paper.

Step 2: Have students use the same websites to gather information for a booklet on the adaptations for survival of one animal for each biome. Each page of the booklet, to be made of notebook paper, should include a picture of the animal, the name of the biome where it lives, and a brief narrative story about a day in the life of the animal. The story should tell what kind of shelter the animal uses, what it eats, what its predators are, and what adaptations it has for survival in its habitat. Completed pages may be attached with staples or brads. A colorful cover may be attached to the front of the booklet.

## **Cross-Curricular Extensions:**

### **SOCIAL STUDIES**

Use the *Biomes in a Box* activity developed for the Woodrow Wilson Biology Institute to create dioramas of each biome represented in your state or the areas of the country or world being studied in Social Studies class.

<http://www.accessexcellence.org/AE/AEPC/WWC/1991/biomes.html>

### **ART**

Use the *Designing a Habitat* activity developed for Project Wild to create a model of an aquatic habitat.

<http://www.projectwild.org/aquactvy.html>

### **MATH**

Using one of the kilocalorie energy pyramids from the *Introduction to Biomes* website, calculate the number of primary consumers and secondary consumers that could be supported by one square kilometer of land in that biome. Graph the results for all biomes included in the study.

### **FOREIGN LANGUAGE**

Determine what biomes are found in the countries of the language studied. Use the information in the adaptations booklets made by the students to write short sentences in the language studied about the animals that live in the biomes of those countries.

### **WOOD SHOP**

Research the types of wood used for constructing buildings, furniture, and other items. Determine whether each wood comes from coniferous forests, temperate forests, or rainforests. Discuss the properties that make the wood valuable for such projects, such as hardness, resistance to insects, grain of the wood, and cost to use.

## READING

Identify the biome as part of the setting for fiction stories. Look for literature set in each biome. Examples: *Call of the Wild* by Jack London is set in the tundra, *Island of the Blue Dolphins* by Scott Odell is set on an island.

### Community Connections:

- Invite a speaker from the State Parks and Wildlife Department, the Forestry Service, the Bureau of Land Management, or a state or national park in your area to discuss the biomes in your area, the plants and animals found there, and any range management issues that are pertinent to the area. \*Note: An online chat or video conference with such a speaker may be arranged if possible in your area.
  
- Plan a field trip to an outdoor area that exemplifies a particular biome, or to an aquarium or museum, which exhibits plants and animals from certain biomes.

Have parents or students bring vacation pictures or videos of trips to various biomes and discuss the climate, landscape, and plants and animals there.

**Home Sweet Home  
Biomes of the World**