Biomes: Forests and Seeds

Grade Level: 6-8	**Subject:** Ecology	**Duration:** Two class periods

Objectives

Students will

- discover that seasonal changes affect life in a temperate forest ecosystem; and
- learn how organisms in a temperate forest are dependent on one another for proper nutrition.

Materials

- Field guides, encyclopedias, and Internet resources about plant and animal life in temperate forests
- Index cards
- Card stock or poster board for seasonal displays
- Five skeins of yarn (different colors)

Procedures

1. In this activity, students will study organisms from an Asian temperate forest and create a food web. Begin the lesson by brainstorming the different kinds of life in a forest. Make a list on the board.

2. Explain that three major types of organisms live in an ecosystem. Producers create their own food through photosynthesis. Consumers hunt or forage for nutrients. Decomposers obtain nutrients by breaking down parts of organisms into simple forms. Example: Bacteria on a forest floor feed off the leaf tissue of fallen leaves, causing the leaves to decay. On the list, have students identify the types of organisms as “P” (producers), “C” (consumers), and “D” (decomposers).

3. Review with students the three types of consumers: Herbivores, or animals that eat plant material, such as the caterpillar; carnivores, or animals that eat other animals, such as forest ants that eat other insects; and omnivores, or animals that eat plant material and animal flesh, such as humans. Ask students to look at the list of consumers and decide which of the three types each is.

4. Next, define a food web, which is a diagram showing how organisms in an ecosystem depend on one another to obtain nutrients and energy. Example: An oak tree food web shows that caterpillars eat the tree’s leaves; beetles eat the bark; woodpeckers eat beetles; jays and squirrels eat the acorns; and the tree makes its own food with photosynthesis.

5. Tell students that they will make food webs for the temperate forest ecosystem in northern Japan. Temperate climates have four distinct seasons, and the plants and animals there must adapt to the changing seasons to survive. Explain that deciduous trees, or trees that shed their leaves in the fall, dominate the plant life in Japanese and North American temperate forests. Oaks, maples, and beeches are found in both. Jays and squirrels are similar animals in both.

Spring	**Summer**	**Fall**	**Winter**
Cherry tree	Cherry tree	Cherry tree	Cherry tree

Maple tree	Maple tree	Maple tree	Maple tree
Oak tree	Oak tree	Oak tree	Oak tree
Beech tree	Beech tree	Beech tree	Beech tree
Macaque	Macaque	Macaque	Macaque
Squirrel	Squirrel	Squirrel	Squirrel
Great spotted woodpecker	Great spotted woodpecker	Great spotted woodpecker	Great spotted woodpecker
Dogtooth violet	Dogtooth violet		
Hornet	Hornet	Hornet	
Horned beetle	Horned beetle	Horned beetle	Horned beetle
Ant	Ant	Ant	Ant
Dormouse	Dormouse	Dormouse	Dormouse
Caterpillar/ butterfly	Caterpillar/ butterfly	Caterpillar/ butterfly	Caterpillar/ butterfly
	Moth	Moth	
Jay	Jay	Jay	Jay
			Duck

6. Divide the class into four groups, each representing a season. Using the chart above, assign each student one organism to research. Each group must include five or six animals and at least three plants.

7. Distribute copies of the chart below as homework. Students assigned to a plant must describe what nutrients it needs and how it changes seasonally. Students assigned an animal must research what it eats in each season.

Life in a Temperate Forest
Name of organism:
1. Describe the organism's appearance.
2. What does the organism eat, or how does it get nutrients?
3. How does this food source change during each season?
4. How does the organism react to seasonal changes?
5. What eats or preys on this organism?
6. Is this organism a producer or a consumer?
7. During which season is the organism most active? Why?

8. Have each group make a food web for their season. Students should write the name of their plant or animal on an index card and arrange the cards in a circle on poster board. Assign each group a different color yarn. Use the yarn to show the organisms' interdependency in each season. Example: In fall, the oak tree would have yarn leading to squirrels and jays, which eat acorns, and to macaques, which eat the leaves and bark.

9. Discuss how the organisms are dependent upon each other during each season.

Evaluation

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

- **Three points:** Students' research was exceptionally well-done: accurate and detailed information on the assigned organism, complete answers to all activity sheet questions; demonstrated a clear understanding of seasonal food webs.
- **Two points:** Students' research was somewhat carefully completed: somewhat detailed information on the assigned organism, completion of most of the activity sheet questions; demonstrated a general understanding of seasonal food webs.
- **One point:** Students' research was partially completed: lack of detail on the assigned organism, completion of some of the activity sheet questions; demonstrated little of an understanding of seasonal food webs.

Vocabulary

coniferous
Definition: Bearing cones and having needle-shaped leaves
Context: A small number of coniferous trees live in temperate forests.

deciduous
Definition: Shedding or losing foliage at the end of the growing season
Context: Deciduous trees are the dominant plant life in temperate forests.

dormant
Definition: In a condition of biological rest or inactivity
Context: During the winter, deciduous trees become dormant to survive the cold.

habitat
Definition: The place an animal or plant normally lives
Context: The temperate forest habitat is rich with plant and animal life.

hibernate
Definition: To pass the winter in an inactive or dormant state
Context: Small mammals lower their body temperatures when they hibernate.

Academic Standards

The National Academy of Sciences provides 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 national standard:

- Life Science: Populations and ecosystems

Credit

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