

THE ACTIVE WORLD OF FRESHWATER BIOMES

PART 6 – Two 60 minute sessions

OVERVIEW

Students read a one-page information sheet about microorganisms. After reading the information, the class will discuss the components of freshwater biomes and how producers, consumers, and decomposers work within the water ecosystem. Each student draws a freshwater ecosystem or biome and includes one source of pollution indicating how it may have an impact based on what they learned during their investigations.

Standards: 5c, 5d, 5e

Materials

- Information Sheet C – The Active World of Freshwater Biomes – 1 per student
- Poster paper
- Drawing/writing materials
- Information Sheets A & B

Vocabulary Words

- Adaptation
- Algae
- Amphibian
- Aquatic
- Biome
- Consumer
- Crustacean
- Decomposer
- Freshwater
- Producer

Other Resources

See Teacher Resources, page 116 for additional activities that relate to freshwater ecosystems.

Helpful Hints

- This activity can be used as a starting point for further study of energy flow in ecosystems and how the energy pyramid works, using a freshwater ecosystem as your example.
- When discussing an ecosystem and the producers, consumers and decomposers that function within them, it is important that students visualize the connections between the different roles.
- Use pictures of different freshwater biomes to help students diagram the different components of a freshwater ecosystem.

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PART 6: THE ACTIVE WORLD OF FRESHWATER BIOMES

They should include abiotic parts: sun, water, air, rock, and soil; and biotic parts: plants, fish, insects, microorganisms, amphibians, etc.

- When students are working independently on their own diagrams, allow them use of Information Sheets A and B as resources.



PROCEDURE

1. Have each student read Information Sheet C – The Active World of Freshwater Biomes
2. As a group, discuss what they read and the roles of organisms in a freshwater biome.
3. As a class or in student groups, illustrate the different components of a freshwater ecosystem.
4. To represent their understanding of living organisms in a water ecosystem and their link to water quality, have students work independently to illustrate a water ecosystem. Have them include one type of land pollution as part of their diagram and describe how it will affect the abiotic factors and therefore the consequences to organisms. Have students label the producers, consumers and decomposers.

GUIDED QUESTIONS



- What are the two basic regions of aquatic biomes?
- What determines whether a water biome is freshwater or marine?
- What is the source of energy for most ecosystems?
- What is the difference between a producer and a consumer?
- How are humans consumers in an ecosystem?
- What is one of the most important producers in a freshwater biome?
- How do organisms of a freshwater biome adapt to their environment?
- What parts of a freshwater biome are biotic?
- What parts of a freshwater biome are abiotic?
- What are two abiotic factors that affect organisms in a river?
- How do humans impact the ecosystems of a freshwater biome?
- How do the conditions of the abiotic factors of a freshwater ecosystem determine the number and types of organisms it can support?

THE ACTIVE WORLD OF FRESHWATER BIOMES

Water ecosystems exist all over the world. We can classify them by their similar characteristics including specific types of organisms, location, and climate. These distinct groupings are called biomes. Water ecosystems fall into two kinds of major aquatic biomes – freshwater and marine.

Freshwater and marine biomes cover nearly 75 percent of the Earth's surface. Freshwater is defined as having a low salt concentration – usually less than 1 percent. Plants and animals in freshwater regions are adapted to the low salt content and would not be able to survive in the ocean. These regions include ponds, lakes, streams, and rivers.

Ponds and lakes are bodies of standing fresh water surrounded by land. Lakes tend to be larger and deeper, while ponds are often shallow enough that sunlight can reach the bottom allowing plants to grow. Streams and rivers are moving bodies of fresh water that usually originate in mountains and come from melting ice or groundwater. They move in one direction and eventually flow into the ocean. Water temperatures are cooler and the oxygen level of streams and rivers is higher.

Within ecosystems, organisms are broken down into three main roles: producer, consumer, and decomposer. Each of these roles is extremely important in the ecosystems of freshwater biomes, as each contributes to the condition and health of the water system.

Producers are organisms that can make all of their own food in an ecosystem. The main producers of a freshwater biome are the plants and algae. When energy enters the ecosystem as sunlight, plants and algae capture the sunlight and store it as food energy. Through the process of photosynthesis, they provide oxygen and food for animals. Algae are one of the most important producers of food for living organisms.

In the fast-running current of streams and rivers, the producers are adapted with special structures that keep them from being carried away by the water. Some plants have strong roots that keep them anchored to the soil, while others have stems that bend easily with the movement of the water. Certain mosses are able to cling to rocks. Plants that live in ponds and lakes have different adaptations. They stretch to meet the sunlit water near the top, and include structures that allow them to float on the surface.

Consumers of an ecosystem cannot make their own food. They depend on producers for their food and energy. The consumers of a freshwater biome include snails, insects, crustaceans, amphibians, fish, and aquatic birds.





Consumers have adaptations as well. Animals, like fish, that absorb oxygen directly from the water have a flat, thin body allowing for increased surface area. Their streamlined bodies also help with swimming and allow them to rest by nosing into a river current. Others have suction-cup like structures on their bodies that allow them to hold on to rocks and the river bottom in fast moving waters. Others are adapted to the calm, still water of lakes and ponds by being able to grab and store oxygen. Some are so lightweight they can skid across the top of the water in search of food.

Decomposers of an ecosystem are microorganisms, like bacteria and fungus, which are responsible for breaking down plant and animal waste and turning it into food for other plants and animals. Decomposers provide an important role in the maintenance of a freshwater biome.

The functions of water biomes are at work everyday! Natural resources such as freshwater biomes are limited. It is important that every component – living and non-living is healthy.

How does the water that flows across the school playground affect local freshwater ecosystems and their biomes? What are the factors that will determine whether populations of organisms will be able to function and support the ecosystem? What can be done to ensure that enough of our water stays clean and is allowed to provide a healthy environment for all living organisms, including you?

