

Lesson 1: Fresh Water

Getting Started

In this unit, you will learn about water on our planet. Before you begin your journey through the seas, you need to understand how the ocean is different from other bodies of water on our planet. Do you know the difference between fresh water and salt water? Fresh water does not have salt, but ocean water does. (Have you ever tasted the water in the ocean? Yuck!) Fresh water is the water we can drink. Fresh water can be found in rivers, lakes, and ponds.

Where do you think fresh water comes from? Snow on mountaintops begins to melt in the spring, as the weather gets warmer. The melting water flows down the mountaintops in streams that flow together to form rivers. Small rivers empty into larger rivers, and these larger rivers eventually flow directly into the ocean.

Note: As you work through your lessons, remember to check off the boxes as you complete each reading assignment and activity.

Stuff You Need

- | | |
|---------------------------------------------------|---------------------------------------|
| ✓ <i>Oceans for Every Kid</i> by Janice VanCleave | ✓ 20 oz. plastic soda bottle with cap |
| ✓ 3 oz. paper cup | ✓ blank paper |
| ✓ food coloring | ✓ freezer |
| ✓ glue stick* (Activity 1 - optional) | ✓ measuring cup |
| ✓ old towel or paper towels | ✓ salt |
| ✓ scissors | ✓ small plastic squirt bottle |
| ✓ spoon | ✓ tap water |
| ✓ teaspoon | ✓ wide-mouthed jar or glass |

Ideas to Think About

- How are living things dependent on fresh water?
- How are organisms in freshwater habitats dependent on one another?

Things to Know

- Fresh water is found in rivers, lakes, and ponds.
- Fresh water is the water we drink and use to wash.

- **Vertebrates** are organisms that have backbones and **invertebrates** are organisms that do not have backbones.

Activities

Activity 1: Freshwater Organisms

Many people are familiar with organisms found in the ocean, but you may not be familiar with organisms in fresh water. **Vertebrates** are animals that have backbones, and **invertebrates** do not have backbones. Here are descriptions of some vertebrate organisms:

- Fish live in water and are covered with scales
- Amphibians live part of their lives in water and part on land
- Reptiles have lungs and dry skin and are usually covered with scales
- Birds have feathers and lay hard-shelled eggs
- Mammals have hair or fur, give birth to live young, and produce milk for their young

Invertebrates are also found in freshwater habitats. Here are descriptions of some common invertebrates:

- Mollusks have soft bodies (no skeleton or exoskeleton), although some mollusks live in a shell
- Crustaceans have two pairs of antennae and eight legs
- Arachnids have two body parts, eight legs, and no antennae
- Insects have three body parts, six legs, and one pair of antennae

Ask a parent which option to complete for this activity. For both options you will use the "Freshwater Organisms" page.

Option 1: Sorting

For this option, you will cut out the organisms found on the "Freshwater Organisms" page and sort them into whether they are vertebrates or invertebrates. Use an encyclopedia or the Internet to find information about organisms you're not sure about. When you are done, try to add your own example of a freshwater vertebrate and freshwater invertebrate.

Option 2: Sorting and Classifying

For this option, you will cut out the organisms found on the "Freshwater Organisms" page and sort them into whether they are vertebrates or invertebrates. Next, place each organism in the correct row on the "Classifying Organisms" page. You will classify the vertebrates as either fish, mammals, reptiles, amphibians, or birds. You will classify the invertebrates as either mollusks, crustaceans, arachnids, or insects. Use the Internet or another research source to find information about organisms whose classification you're not sure about. When you are done, add your own example of a freshwater organism to each column.

Activity 2: Water Quality and Animals

Scientists determine the health of a freshwater source by how many organisms and the variety of organisms that can be found there. Good water quality also has few pollutants. The chart below indicates some of the animals that can be found in freshwater with varying quality.

Determining Water Quality		
Good Water Quality	Fair Water Quality	Poor Water Quality
Mayfly larvae	Crayfish	Aquatic worms
Stonefly larvae	Scud	Leech
Caddisfly larvae	Dragonfly nymph	Pouch snail
Dobsonfly larvae	Crane fly larvae	Midge fly larvae
Water penny	Clam	Blackfly larvae
Riffle beetle	Damselfly larvae	Carp
Trout	Sow bug	Catfish

Visit a nearby freshwater habitat. See if you observe any of the animals on the list. If you can speak with a park ranger or scientist, ask which animals live in the water. See if you can find any information on the body of water online. On the page, "Water Quality and Animals," you will find pictures of each of the organisms. This page can serve as your field guide. Circle the animals you discover.

Activity 3: Freshwater Food Web

Think about how organisms in freshwater are interdependent. A food web shows a variety of plants of animals and draws lines between those that eat one another. Design a food web for a freshwater habitat that shows which animals eat one another. You may want to research the diets of organisms found in freshwater habitats.

NOTE: If you are unfamiliar with food webs, refer to p. 174 of *Oceans for Every Kid* for an example of a food web in the ocean.

Label the organisms as the following:

- producers (plants)
- primary consumers (eat only producers)
- secondary consumers (eat primary consumers)
- tertiary consumers (eat secondary consumers)

Reading and Questions

Read *Oceans for Every Kid*, pages 121-123, and then answer the questions.

1. What do rivers carry into oceans besides water?

2. Since rivers flow into the oceans, why don't the oceans overflow?

3. What is the most abundant salt in the oceans?

Activity 4: River Water vs. Ocean Water

In this activity you will see what happens when freshwater from rivers flows into the ocean. First, gather your materials. You will need a measuring cup and measuring spoon (teaspoon), a spoon for stirring, a 20 oz. plastic soda bottle (and its cap), a small plastic squirt bottle, salt, food coloring, and an old towel or some paper towels. Next, follow these steps:

1. Combine 1/2 cup (125mL) of tap water with 3 teaspoons of salt. Stir the salt and water together. Note that some of the salt may not dissolve.
2. Pour the salt water into the soda bottle. Lay the bottle on its side on the towel, making sure the salt water does not pour out. The salt water represents ocean water.
3. Fill the squirt bottle about halfway with tap water. Add enough food coloring to make the water dark. You can use any color.
4. Insert the nozzle of the squirt bottle into the soda bottle.
5. Carefully squeeze the squirt bottle to allow the colored water (river water) to flow gently onto the salt water (ocean).
6. Remove the squirt bottle from the soda bottle. What do you notice about the two layers of water?
7. With the soda bottle still on its side, replace the cap. Rock the bottle gently back and forth to create waves. What happened to the layers?

Reading and Questions

Icebergs are made of freshwater. Read about icebergs on pages 157-159 of *Oceans for Every Kid*. Answer the following questions.

1. How are icebergs formed?

2. What is a glacier?

3. Why do icebergs float?

4. Could you drink a melted iceberg? Why?

Activity 5: Watch Out Below!

Conduct the experiment described on pages 162-164 of *Oceans for Every Kid*. Discuss with a parent why you think ships are careful to avoid icebergs.

Wrapping Up

In this lesson you learned about some organisms found in freshwater habitats, what happens when river water meets the ocean, and what happens to frozen freshwater (icebergs) in the ocean. In the next lesson you'll learn about the water cycle, or how water in oceans, lakes, and rivers becomes rain, snow, and other kinds of precipitation.

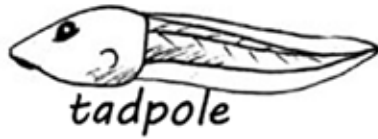
Life Application

How's My Waterway?

www.movingbeyondthepage.com/link/9231/

You can use this website to learn more about the water in your state or community.

Freshwater Organisms



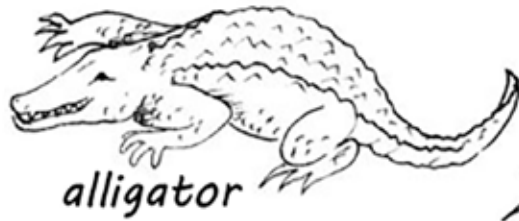
tadpole



beaver



arapaima



alligator



snail



crane



water mite



crayfish



turtle



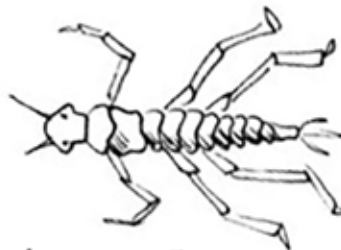
goose



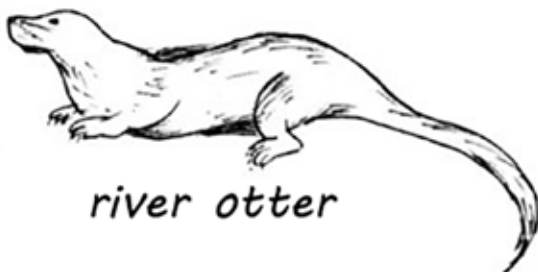
catfish



large-mouth bass



dragonfly nymph



river otter



newt

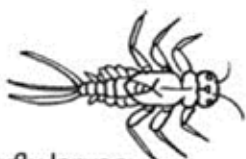



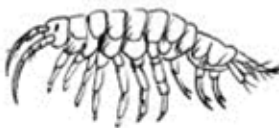


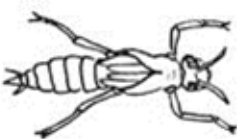


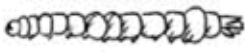








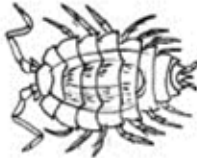

Classifying Organisms

Invertebrates

Vertebrates

insects	
crustaceans	
arachnids	
mollusks	
	mammals
	birds
	reptiles
	amphibians
	fish

Water Quality and Animals

Good water quality	Fair water quality	Poor water quality
 Mayfly larvae	 Crayfish	 Aquatic worms
 Stonefly larvae	 Scud	 Leech
 Caddisfly larvae	 Dragonfly nymph	 Pouch snail
 Dobsonfly larvae	 Crane fly larvae	 Midge fly larvae
 Water penny	 Clam	 Black fly larvae
 Riffle beetle	 Damselfly larvae	 Carp
 Trout	 Sow bug	 Catfish

Parent Overview

Lesson 1: Fresh Water

Getting Started

? Big Ideas

- How are living things dependent on fresh water?
- How are organisms in freshwater habitats dependent on one another?



Facts and Definitions

- Fresh water is found in rivers, lakes, and ponds.
- Fresh water is the water we drink and use to wash.
- **Vertebrates** are organisms that have backbones and **invertebrates** are organisms that do not have backbones.



Skills

- Recognize that most of Earth's water is present as salt water in the oceans, which cover most of Earth's surface. (S)

Introducing the Lesson

Tell your child that, in today's lesson, he will discover the difference between salt water and fresh water. Then he will explore fresh water habitats and the amazing organisms that live there. The lesson ends with a study of icebergs.

Outline of Activities and Answer Keys

Activity 1: Freshwater Organisms

Your child was introduced to the vertebrate and invertebrate organisms. Choose an option for your child to complete for this activity. For Option 1, your child will cut out the organisms found on the "Freshwater Organisms" page and sort them into vertebrates and invertebrates. For Option 2, in addition to sorting the organisms, your child will also classify them as fish, amphibians, reptiles, birds, or mammals (for vertebrates) and mollusks, crustaceans, arachnids, and insects (for invertebrates). Option 2 is more challenging.

Option 1: Sorting

Your child will sort the organisms into vertebrates and invertebrates. Encourage him to research organisms he is not sure about. Also invite him to add his own example of a freshwater vertebrate and freshwater invertebrate.

Answer Key:

- **Vertebrates:** arapaima, large-mouth bass, catfish, river otter, beaver, turtle, alligator, tadpole, newt, goose, crane
- **Invertebrates:** snail, crayfish, water mite, dragonfly nymph

Option 2: Sorting and Classifying

Your child should cut out the pictures and sort the organisms into vertebrates and invertebrates. Then he should further classify them using the chart on the "Classifying Organisms" page. He can use the Internet or another research source to find out information about organisms he's not sure about. Encourage him to add at least one organism of his own to each column.

Answer Key:

Vertebrates	
Fish	Arapaima, large-mouth bass, catfish
Mammals	River otter, beaver
Reptiles	Turtle, alligator
Amphibians	Tadpole, newt
Bird	Goose, crane

Invertebrates	
Mollusks	Snail
Crustacean	Crayfish
Arachnids	Water mite
Insects	Dragonfly nymph

Activity 2: Water Quality and Animals

If possible, take your child to observe a freshwater habitat in order to complete this activity. If you are not able to visit a habitat, encourage him to research a large body of freshwater and find examples of the organisms that live there.

Activity 3: Freshwater Food Web

Answers will vary. Be sure that your child includes a producer in the food web.

Reading and Questions (Answers)

1. What do rivers carry into oceans besides water?
 - Salt.
2. Since rivers flow into the oceans, why don't the oceans overflow?
 - Water evaporates from the oceans and returns to Earth as precipitation like rain or snow.
3. What is the most abundant salt in the oceans?
 - Sodium chloride. (That is table salt.)

Activity 4: River Water vs. Ocean Water

In this activity your child will see what happens when freshwater from rivers (represented by colored tap water) pours into salty water in oceans (represented by tap water mixed with salt). The salty water is denser, so the freshwater should float on top creating two layers. When your child rocks the soda bottle (ocean) back and forth, he should see the layers begin to mix. Assist your child as needed.

Reading and Questions (Answers)

1. How are icebergs formed?
 - Pieces of glaciers break off into seawater in a process called calving to produce icebergs.

2. What is a glacier?

- A huge mass of ice formed by compressed snow.

3. Why do icebergs float?

- Ice floats on water. Also, icebergs are formed from freshwater, which floats on the denser salty ocean water.

4. Could you drink a melted iceberg? Why?

- Yes, because it is made of freshwater.

Activity 5: Watch Out Below!

Your child should follow the instructions for the experiment described on pp. 162-164 of *Oceans for Every Kid*. He should be able to see that, like icebergs, most of the ice cube remains below the water level. Ships avoid icebergs because it is impossible to tell from the surface how large the iceberg is under water.

Wrapping Up

Questions to Discuss

When your child finishes his lesson, ask the following questions for review.

- What is the difference between freshwater and saltwater?
- What bodies of water contain freshwater?
- What organisms can be found in freshwater?
- What relationships exist between freshwater organisms?
- What did you learn about icebergs?

Things to Review

Review the "Things to Know" (found in the "Getting Started" section) with your child. These are important words and ideas you want to reinforce and encourage your child to memorize. They can be found at the beginning of "Introducing the Lesson."