

The Water Planet

OBJECTIVES

Students learn that most of the Earth's surface is covered with water and that, without water, there would be no life on Earth.

The students

- ▶ examine a globe and conclude that much of the Earth is covered with water
- ▶ infer that, without water, there would be no life on Earth
- ▶ learn that some bodies of water are salty and others are fresh
- ▶ conclude that some plants and animals live in salt water and others live in fresh water

SCHEDULE

About 40 minutes

VOCABULARY

aquarium
fresh water
salt water

MATERIALS

For each student

- 1 Activity Sheet 1

For each team of four

- 2 dishes, plastic

For the class

- 2 basters*
- 2 containers, 1-qt*
- 1 globe, topographical*
- 1 map of local area (optional)*
- 1 roll paper towels*
- 1 cont salt, table*
- 1 spoon, plastic
- 1 roll tape, masking
water, tap*

*provided by the teacher

PREPARATION

- 1 Make a copy of Activity Sheet 1 for each student.
- 2 Obtain a globe that shows the topographical features (rather than political boundaries) of the Earth.
- 3 Mix 1 quart of warm tap water and 2 tablespoons of salt in a clean 1-quart container. Using the masking tape, label the container *Oceans*. Fill a second container with plain tap water and label it *Lakes and Ponds*. Place both containers and two basters at a distribution station.
- 4 Have paper towels available in case of spills.

BACKGROUND INFORMATION

Satellite photographs of the Earth taken from space show a planet covered with water. Except for a few islands called **continents**, 70 percent of the Earth's surface—about 140 million square miles—is covered with water. Several other planets contain water

vapor in their atmosphere or ice crystals on their surface, but Earth is the only planet in our Solar System that contains life-sustaining, liquid water.

Scientists believe that life began in the oceans about 3.5 billion years ago and that many animals that live on land today evolved from those living in water. Scientists estimate that about 90 percent of all living organisms on Earth live in water, from microscopic plants and animals, called plankton, to the 100-foot-long blue whale, the largest mammal to ever inhabit the Earth. The other 10 percent live on land but require water to survive.

There are two types of water on Earth: **salt water** and **fresh water**. The salt water in the oceans and in a few large lakes accounts for about 97 percent of all the water on Earth; the fresh water found in lakes, rivers, ponds, and streams accounts for about 1 percent. (The other 2 percent is frozen in the Earth's polar caps.) Plants and animals have adapted well to life in their fresh water or salt water environments, although, with few exceptions, plants and animals that live in one type of water cannot survive in the other.

Water is the source of all life on Earth; without it, every plant and animal—both aquatic and terrestrial—would perish. The purpose of this

activity is to teach students the importance of water to life on Earth. This will prepare them for setting up an **aquarium**, in which they will study some common plants and animals that live in fresh water.

▼ Activity Sheet 1

The Water Planet

Circle each thing that needs water to live.



Guiding the Activity

1

Display a globe for all students to see. Ask, **Who can tell me what this is?**

Ask, **What is a globe used for?**

Ask students to note the different colors on the globe. Elicit that brown and green represent land, white at the top and bottom of the globe represents the ice at the north and south poles, and blue represents oceans, lakes, and rivers.

Ask, **Which color covers most of the globe?**

Additional Information

Some students will know that it is a globe.

A globe is a model of the Earth. It shows what the Earth looks like from far away.

blue

Guiding the Activity

Ask, **What does this tell you about the surface of the Earth?**

2

Ask students to brainstorm a list of plants and animals. Accept all responses, and write them on the board. Then ask, **Where do each of these plants and animals live?**

Ask, **Which of these plants and animals need water to survive?**

Ask, **Do you think plants and animals that live on land need water to survive?**

Explain that most of the plants and animals on Earth live in or near water but that even plants and animals that live on land need water to survive. Land plants need water to help them grow. They get water from rain. Land animals drink water when they are thirsty, some catch their food in water, they use water to clean and cool their bodies, and some swim or float in water.

Additional Information



▲ *Figure 1-1. Over 70 percent of the Earth's surface is covered with water.*

It is covered mostly with water. (See Figure 1-1.)

Help students distinguish between organisms that live only in water, such as fish and water lilies; organisms that live both on land and in the water, such as frogs, ducks, and seals; and organisms that live only on land, such as horses and elephants.

Students will probably name those organisms that live in or near water.

Students may realize that all living things need water to survive.

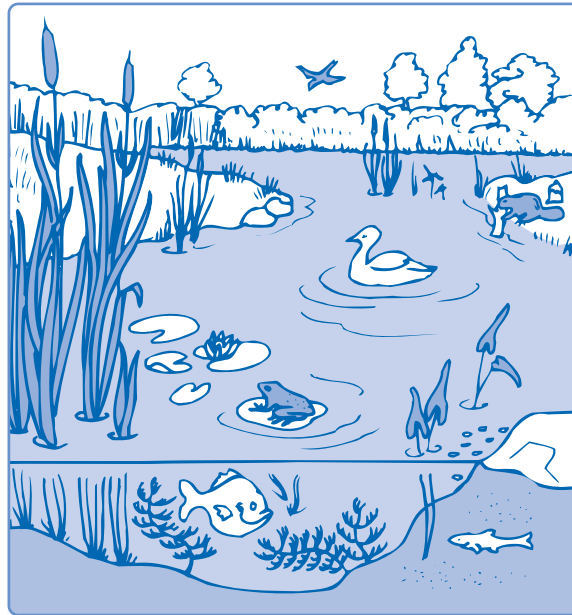
Guiding the Activity

Ask, **What do you think would happen if all of the water on Earth dried up?**

Distribute a copy of **Activity Sheet 1** to each student. Read aloud the instructions at the top of the sheet, and ask students to complete it.

Additional Information

Lead students to conclude that, without water, there would be no life on Earth (see Figure 1-2).



▲ Figure 1-2. All living things need water to survive.

3

Tell students that the water in the oceans is different from the water in lakes and ponds. Explain that you are going to give them a sample of each kind of water, and they are to guess what that difference is.

Divide the class into teams of four. Point out the containers of water at the distribution station: one filled with water that is similar to ocean water, the other filled with water similar to lake or pond water.

For each team, use a baster to put a small amount of salt water into one dish and another baster to put some plain tap water into the other dish. Distribute one dish of salt water and one dish of plain water to each team. Explain that the water they have just been given is safe to taste, but that as a rule they should never taste any substance in science class without your permission.

Make sure the plastic dishes and the baster are clean. Have students wash their hands with soap and water before participating in this part of the activity.

Guiding the Activity

Ask students to dip a finger into each dish and taste the water. Then ask, **How do they taste?**

Ask, **Have any of you ever gone swimming in the ocean? What did you notice about the water?**

Ask, **Have any of you ever gone swimming in a lake or pond? How did the water taste?**

Write the terms *fresh water* and *salt water* on the board. Explain that most lakes, rivers, ponds, and streams contain **fresh water**, while the oceans and a few very large lakes, called seas, contain **salt water**.

Help students locate on the globe areas of fresh and salty water.

4 Explain that some plants and animals live in salt water, and some live in fresh water. Very few can live in both.

Ask, **Which of the plants and animals listed on the board live in the salty water of the ocean? Which live in fresh water lakes and ponds?**

5 Write the word *aquarium* on the board. Ask, **Does anyone know what an aquarium is?**

Explain that aquariums can contain either salt water or fresh water, depending on the type of plants and animals that are to be put into them.

Tell students that in the following activities, they are going to build and observe an aquarium filled with living things commonly found in fresh water lakes and ponds.

Additional Information

Students will discover that one sample of water tastes salty and one tastes like ordinary tap water.

It tasted salty.

Like water from the faucet; it was not salty.

You may also want to try this on a map of your local area. Or, you could name bodies of water in your local area and ask students if the water in them is fresh or salty.

Help students differentiate between these two categories of water dwellers.

*Students who have one in their home will know that an **aquarium** is a container used for the study and display of plants and animals that live in water.*

REINFORCEMENT

Set up a bulletin board titled “Water: Who Needs It?” In the middle, place a satellite photo of the Earth. Then have students find pictures of plants and animals that need water to survive. They can cut out pictures from newspapers and magazines or draw their own. Encourage variety—both plants and animals, on land and in water, salty or fresh.

SCIENCE JOURNALS

Have students place their completed activity sheets in their science journals.

CLEANUP

Collect the plastic dishes and discard the water. Rinse the dishes and the spoon and allow them to air dry. Return the dishes and the spoon to the kit.

SCIENCE AT HOME

Students can use household objects to model for their families the proportion of Earth’s surface that is covered by water—75 percent, or three-fourths. Challenge students to take any four identical objects—such as pieces of pasta, paper cups, or pillows. They should divide the objects into a group of 3 (representing water) and a “group” of 1 (representing land). The simple demonstration makes it easy to see the overwhelming abundance of water compared with land. Invite interested students to invent their own way to show three-quarters, three-fourths, or 75 percent.

Connections

Science Challenge

Tell students that most living things contain more water than any other material. To show this, do the following demonstration: Use a kitchen scale to measure out 1 pound of fresh spinach from a grocery store. Put the spinach in an uncovered baking dish and heat it in an oven at 212°F (or the lowest oven setting) for 1 hour. Let students observe the change in the appearance of the spinach. When the spinach has cooled sufficiently, weigh it again. The difference between its original and final weights represents the weight of the water that evaporated from it when it was heated. (Spinach is about 90 percent water. The heated spinach will probably weigh between 1 and 2 oz.)

Science Extension

Ask students what they think would happen if they let some salt water dry up, like a puddle does after it rains. Accept all responses. Then have each team fill a shallow dish about half full of salt water and leave it in a warm location. When the water has evaporated, have students examine the dishes and describe what they see. (The salt left behind when the water evaporated will have formed a crust of tiny crystals.) Provide magnifiers so students can examine the crystals more closely.

Science and the Arts

To reinforce the water-to-land ratio on Earth, let each team make its own globe by covering an inflated balloon with papier-mâché. When the globes are dry, help students sketch the continents on them. Then let students paint the oceans, seas, and large lakes blue and the land areas green or brown. Suspend the globes from the classroom ceiling with string.

Science and Health

Tell students that their own bodies are made up mostly of water. When the body does not get enough water, a person can become very sick. To be healthy, a person should drink plenty of water and other fluids every day, especially when the person is exercising or when it is hot.

Science and Language Arts

To introduce students to some of the animals that live in the ocean, obtain a copy of the children's book *A Swim Through the Sea* by teenage author/illustrator Kristin Joy Pratt (DAWN Publications, 1994), and read it aloud to students in small groups. In this book, Seamore the seahorse takes readers on an alphabetical guided tour beneath the sea, where they “discover delightful dolphins diving up and down,” “join a jet-propelled jellyfish for a jolly jaunt,” “meet many munching manatees,” and encounter other marine animals from A to Z. The read-aloud text is accompanied by facts about the creatures' anatomy and behavior, which you could also share with students.

Science and Social Studies

Show students a large map of the world, and ask them to describe how the map and a globe are alike and how they are different. (Both show all the parts of the Earth, but the map is flat and the globe is round. The flat map shows all the Earth's parts at once, but the globe has to be turned to see all the parts.) Obtain a very simple world map—one with the continents outlined but with no geopolitical boundaries shown—and make a photocopy for each student. Let students color the map to show oceans, seas, lakes, and land.