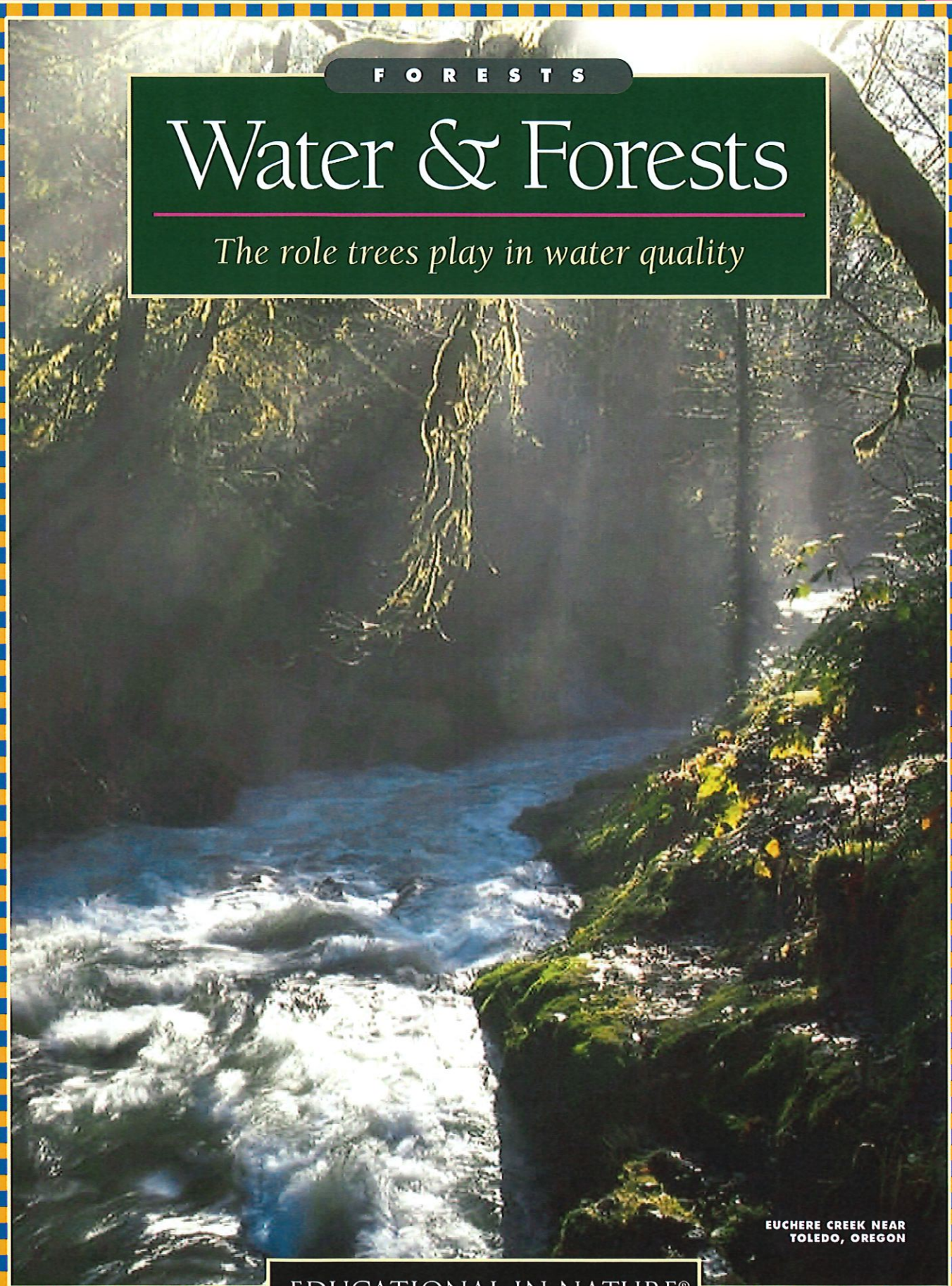
FORESTS

Water & Forests

The role trees play in water quality



EUCHERE CREEK NEAR
TOLEDO, OREGON

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Why Is Water Important?

What's so special about water? It has no color, no taste and no smell. It is one of the simplest chemical substances, made of just three atoms. It appears to be everywhere — in clouds, oceans, ice and steam.

Water seems common, but you might be surprised to know just how uncommon it really is. As far as we know, Earth is the only planet in our solar system where water exists as a liquid. No living thing — plant or animal — can survive without it.

ABOUT 70% WATER

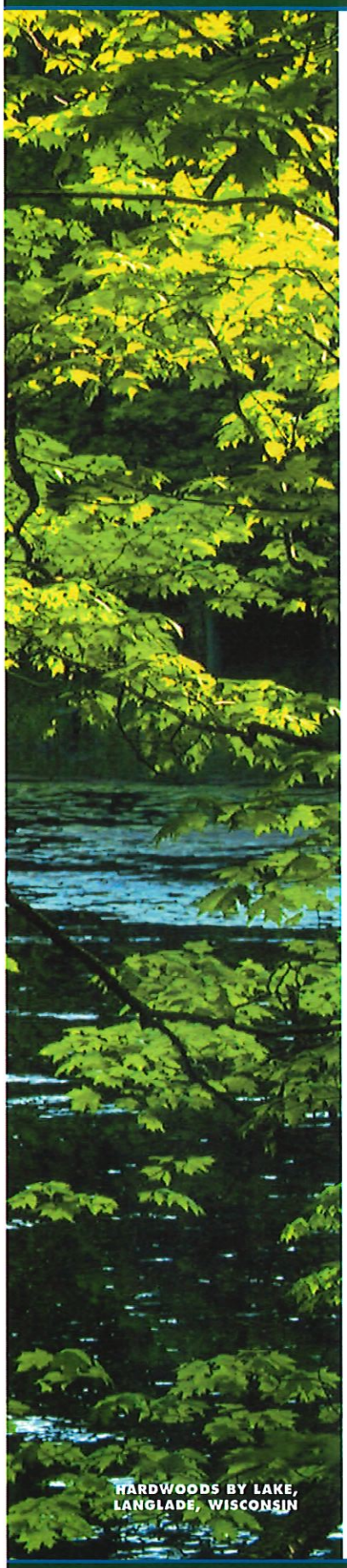
ABOUT 60% WATER

MORE THAN 50% WATER

In fact, water makes up a large percentage of all living things — and the Earth also! Water covers more than two-thirds of the Earth. About 60 percent of the human body is water. And more than 50 percent of a tree is made up of — you guessed it — water!

The water of the Earth's surface is mainly found in oceans (more than 97 percent) and frozen polar ice caps and glaciers (about 2 percent). Less than one percent of all the surface water on Earth is fresh water that you and I can drink.

Because water is necessary for life, it's important that we keep it clean. A forest plays a big role in maintaining and improving water quality.



HARDWOODS BY LAKE, LANGLADE, WISCONSIN

HOW DO TREES BREATHE?

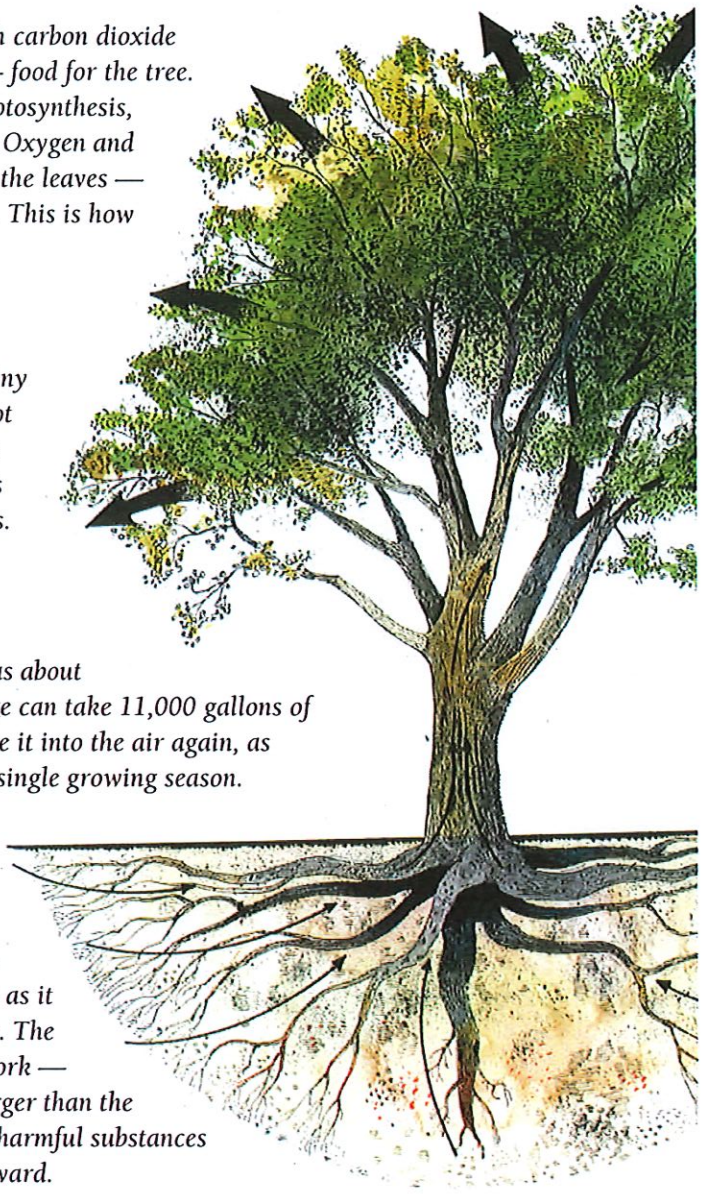
In leaves, water combines with carbon dioxide and sunlight to make sugar — food for the tree. During this process, called photosynthesis, the tree also produces oxygen. Oxygen and water then evaporate through the leaves — a process called transpiration. This is how a tree breathes.

HOW DO TREES DRINK?

Water in the soil passes into tiny hairlike roots. It enters the root loaded with minerals from the soil and is carried up the tree's trunk all the way to the leaves.

HOW MUCH WATER DOES A TREE DRINK?

A healthy 100-foot-tall tree has about 200,000 leaves. A tree this size can take 11,000 gallons of water from the soil and release it into the air again, as oxygen and water vapor, in a single growing season.

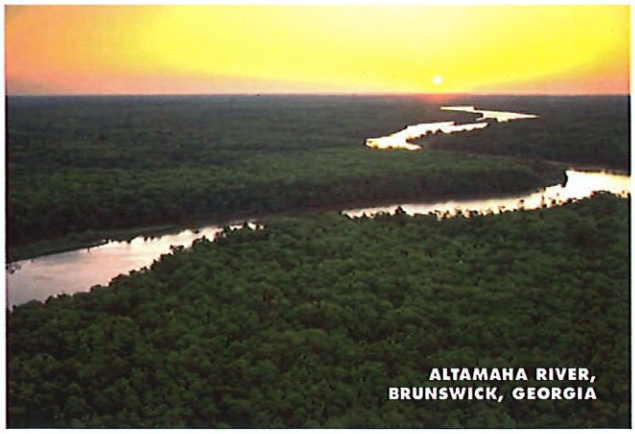


ROOTS DO MORE THAN DRINK

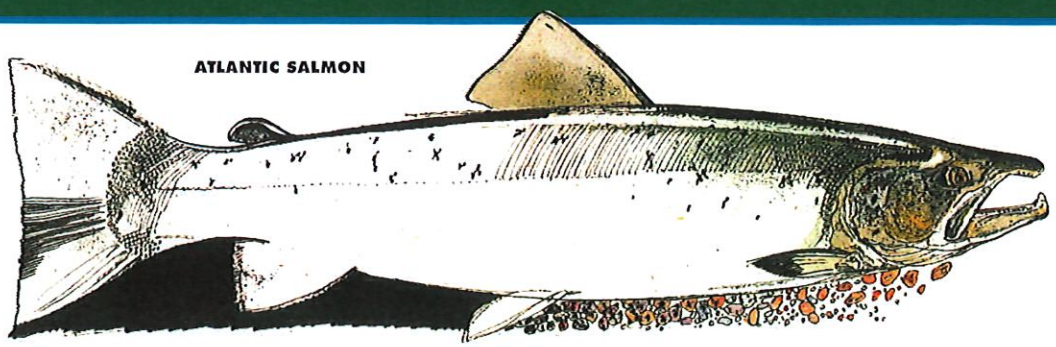
The roots of a tree grip the ground and act like thousands of "fingers" to anchor the tree as it keeps soil from washing away. The amazingly complex root network — often an area underground larger than the tree's branches — also filters harmful substances out of water as it soaks downward.

STREAMSIDE BUFFERS

Leaving stream and river banks as natural as possible — with the soil undisturbed and covered with trees, shrubs, wildflowers, mosses and ferns — helps prevent erosion. A stream bottom filled with pebbles — rather than a dirt-filled bottom — is one sign of a healthy stream.



ALTAMAHA RIVER, BRUNSWICK, GEORGIA



MADE IN THE SHADE

Many different animals live in forests near water. Otters, beavers, deer, herons, salamanders, snakes, alligators, frogs, turtles and many other creatures depend on forest lakes and streams for food, drink, homes and protection.

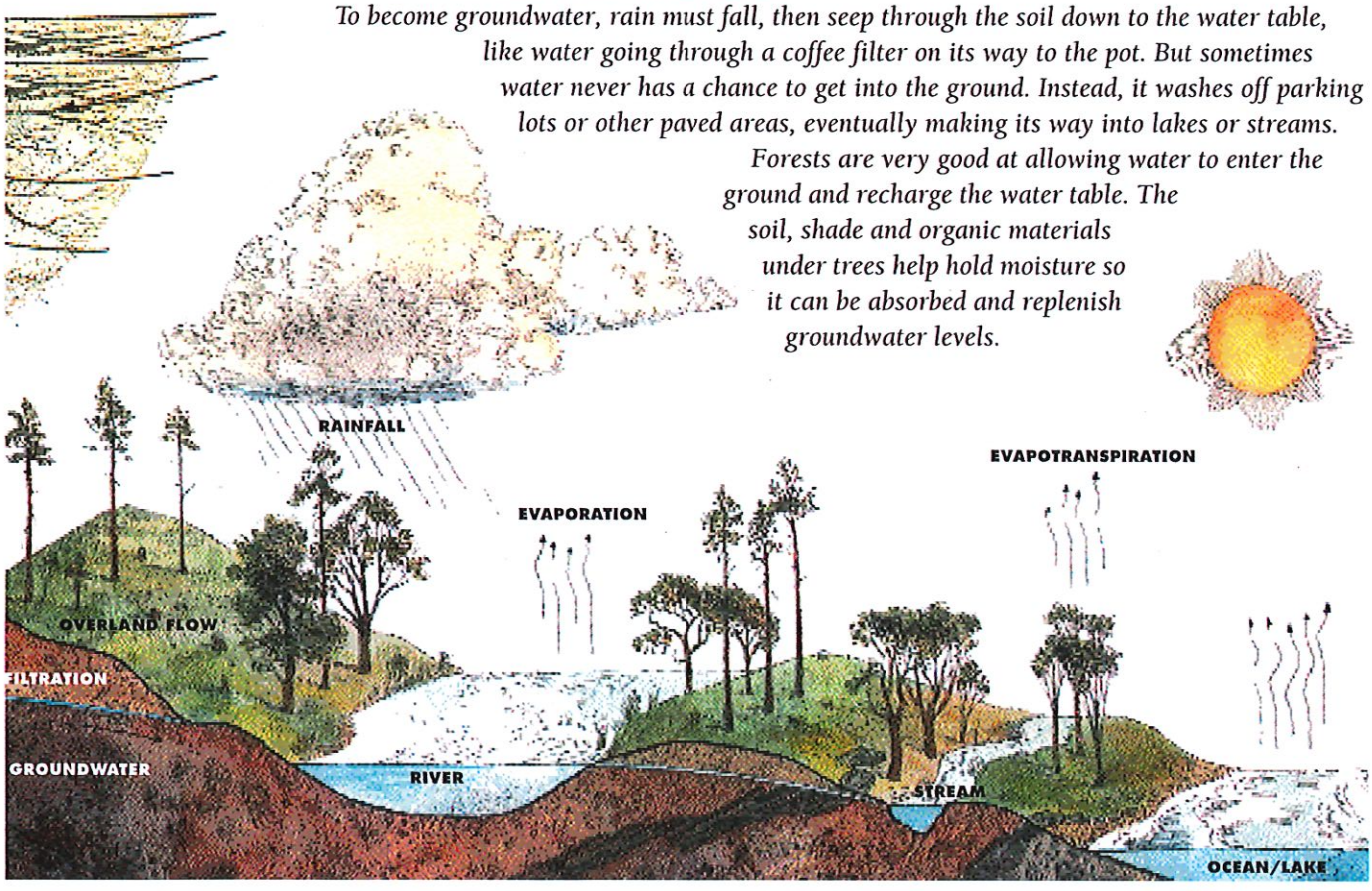
In some streams, the shade of trees plays an important role in the lives of certain fish. Brook trout and salmon are sensitive to changes in water temperature. These fish will lay their eggs only in cool water. If there are no trees or other plants along stream banks, direct sunlight will heat the water so the eggs won't hatch.

TWO-LINED SALAMANDER

FOREST SOIL HELPS THE WATER TABLE

To become groundwater, rain must fall, then seep through the soil down to the water table, like water going through a coffee filter on its way to the pot. But sometimes water never has a chance to get into the ground. Instead, it washes off parking lots or other paved areas, eventually making its way into lakes or streams.

Forests are very good at allowing water to enter the ground and recharge the water table. The soil, shade and organic materials under trees help hold moisture so it can be absorbed and replenish groundwater levels.



changes the environment, creating ecosystems full of life. It moves in various forms through a complex cycle of evaporation, transpiration and nsation. The sun and the Earth's gravitational pull ultimately provide the energy sources for this process.

What is a Watershed?

Raindrops fall. Some soak into the ground. Some join with other drops and trickle down slopes. The trickles join to form streams. These streams connect to make rivers. Rivers then make their way to the sea.

All the land drained by a stream and its branches, or by a river and its streams, is called a watershed.

Scientists study watersheds to learn how much water is available to meet people's needs. The topography — the physical appearance of the land — along with the plants, the soil, the rock formations and the climate, all affect the water in a watershed.

Forests and the Watershed

Heavy rain in a watershed can cause severe flooding, which destroys land and property. Flooding is less likely if a watershed has carefully managed forest areas or wetlands. (Wetlands are places that are flooded or boggy all or part of the year. Forests can be wetlands, too.)

Forest soils soak up water. The roots of trees also anchor soil and keep it from washing away — even after the trees are harvested. Wetlands — usually swamps and marshy areas — act as natural sponges, soaking up rainwater that might cause flooding.

UNDERGROUND RIVERS

The lakes, streams and oceans you see are not our only sources of water. There is a supply of water under the ground, called groundwater. Cities and towns use underground lakes and rivers, called aquifers, for drinking, watering crops, manufacturing and other purposes.

Groundwater may lie hundreds of feet down or be very close to the surface. The surface level of groundwater is called the water table.

Water & Forests

FORESTS

ACTIVITIES & Extras

Make a model watershed

You can build your own watershed with the following materials:

- *A plastic water jug or a milk carton*
- *One rectangular aluminum pan (available at a supermarket)*
- *A package of flavored drink powder (grape or cherry is best)*
- *Aluminum foil*
- *Paper cups*

First, cut the paper cups, making them different heights. Then place them in the aluminum pan, bottom up. These will be the "mountains" in your watershed.

Next, stretch aluminum foil over the cups. Press the foil down so that it fits snugly, high and low, over all the "mountains." Tightly wrap aluminum foil at the edges of the pan.

Punch three or four small holes in the upper corner of your plastic jug or milk carton. When you fill this container with water, it will then sprinkle "rain." Let the rain fall gently over the watershed, and notice how the water travels.

Next, sprinkle drink powder on different parts of the watershed. Make it rain again. If the drink powder represents pollution, describe how it can travel from one part of a watershed to another.

(This activity was adapted from a program developed by Valerie Chase at the National Aquarium in Baltimore, Maryland.)

BRING A POOL TO SCHOOL

Streams and lakes are all different. Here's a project that can show you and your classmates what's in the water in different places.

With an adult to help, take a clear plastic container to a public pond, stream or lake. Fill the container with water, then bring it to school.

Label the container with your name and the name of the water source. Let the water stand for a day or two. Then look at it closely.

Each container will have sediment inside — mud, small particles of dirt, plants and even tiny animals. These sediments will settle on the bottom in some containers or float around, barely visible, in others.

Strain the water through a paper filter. Look at the sediment again. You will see there's a big difference in water from different sources.

WORDS TO KNOW

condensation - the process of changing water vapor in the air to a liquid form

ecosystem - the interaction of all biological and physical elements in a specific environment

evaporation - when water is taken up into the air in a gaseous form

evapotranspiration - movement of water from plants or from the soil by both evaporation and transpiration

groundwater - any water naturally found under the ground

infiltration - the process of water soaking into the soil

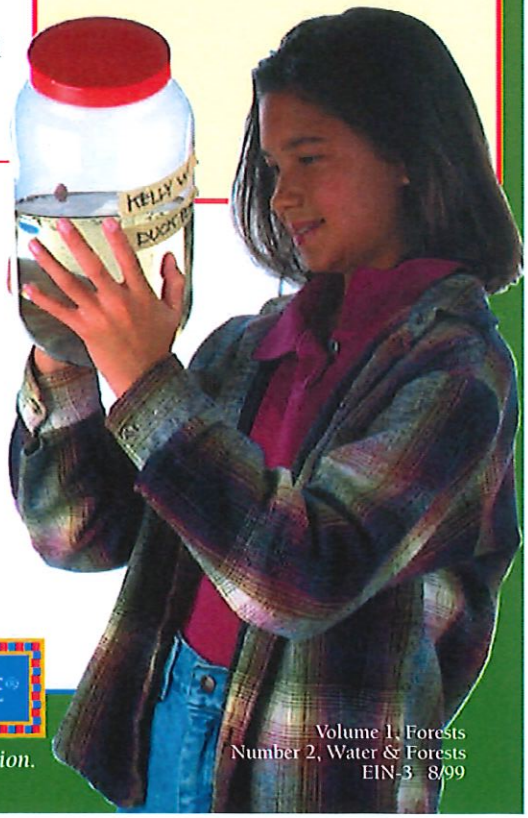
photosynthesis - the process plants use to make their food

sediment - tiny particles of soil carried and deposited by water

streamside buffers - areas along streams or rivers where trees and other plants are left to hold the soil in place; they also act as filters for sediment

transpiration - the way a tree breathes

wetlands - areas of land that are wet all or part of every year



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