

Follow-up Discussion

The most important part of this segment is to examine both the facts and beliefs generated by the class in their "Everything We Know About..." list. Research indicates that students will retain their previous misconceptions — in preference to the new information — until they actively recognize and correct their own errors. Because of this, it is important to lead students to the correct ideas while identifying and correcting any misconceptions from the class list. After reviewing the list, encourage students to share the answers they got to the questions raised, before viewing the program.

Raising a thought-provoking question is a good way to assess the overall depth of student understanding. A couple of suggestions are listed below:

- Why is water so important?
- Does the Earth have more or less water now than 1,000 years ago? Explain.
- How does water get into the oceans?

Follow-up Activities

- Have your students verify that the water cycle helps purify the Earth's water supply by placing a small, clean bowl inside a large bowl of salty water. Cover the bowls with plastic wrap and place a weight on the wrap above the small bowl. This will allow the fresh water that has evaporated to condense and collect on the plastic film and drip into the small bowl. You can add food coloring to the salt water to further illustrate the purifying process that we call the water cycle.
- Lead a class discussion on cloud formation, cloud types, fog and dew. Provide a number of Internet, print and video resources for the students to use to research the cloud topic that interests them the most. Provide a place for the children to create a "Class Clouds" bulletin board.
- Have your students perform a "water cycle" skit for other classes. Provide a list of roles: the sun, water molecules that join to make droplets and then congregate to make clouds, minerals such as salt and limestone, chemicals like fertilizer and pesticides, and organisms like farmers, fish and plants. After choosing their roles, have some children create props while others write and direct the skit.
- Ask students to research their local watershed to find out where their own drinking water comes from. Invite curious students to find out more about the water quality and the ways their water is being protected from pollution. A good place to find valuable information is the "Give Water a Hand" web site at www.uwex.edu/erc/gwah.

Suggested Internet Resources

Periodically, Internet Resources are updated on our web site at www.LibraryVideo.com

- www.units.muohio.edu/dragonfly/water/watercycle.shtml
This website, from the pages of "Dragonfly," an Internet children's science reference from Miami University of Ohio, includes graphics that help explain the water cycle.
- www.acnatsci.org/education/river/page1.html
These pages from the Academy of Natural Sciences web site chronicle the water cycle from river to home and suggest ways children can make a positive impact on water conservation and pollution.
- www.k12.atmos.washington.edu/k12/pilot/water_cycle/index.html
"Water: A Never-Ending Story" is an interactive educational module sponsored by NASA and developed by K-12 educators. It is part of the "Live From Earth and Mars" web site.

Suggested Print Resources

- Berger, Melvin. *Water, Water Everywhere: A Book about the Water Cycle*. Ideals Publications, Charlotte, VT; 2001.
- Locker, Thomas. *Water Dance*. Voyager Books/Harcourt, San Diego, CA; 2002.
- McKinney, Barbara Shaw. *A Drop Around the World*. Dawn Publications, Nevada City, CA; 1998.
- Waldman, Neil. *The Snowflake: A Water Cycle Story*. Millbrook Press, Brookfield, CT; 2003.

TEACHER'S GUIDE CONSULTANT

Conrad M. Follmer

25 years as a K-5 Science & Math coordinator for a Pennsylvania public school system, currently an independent consultant to elementary schools.

TITLES

- ALL ABOUT EARTHQUAKES
- ALL ABOUT EARTH'S HISTORY
- ALL ABOUT FOSSILS
- ALL ABOUT LAND FORMATIONS
- ALL ABOUT NATURAL RESOURCES
- ALL ABOUT ROCKS & MINERALS
- ALL ABOUT SOIL
- ALL ABOUT VOLCANOES
- ALL ABOUT THE WATER CYCLE
- ALL ABOUT WEATHERING & EROSION

Teacher's Guides Included
and Available Online at:



800-843-3620

Teacher's Guide and Program Copyright 2000 by Schlessinger Media,
a division of Library Video Company

9/04

P.O. Box 580, Wynnewood, PA 19096 • 800-843-3620

Executive Producers: Andrew Schlessinger & Tracy Mitchell

Programs produced and directed by Burrud Productions Inc.

All rights reserved

K7063
V6118

Earth Science for Children™



All About the Water Cycle

Grades K-4

This guide is a supplement, designed for educators to use when presenting this program in an instructional setting.

Before Viewing: Research in learning suggests that it is important for the teacher to discover what the students know — or think they know — about a topic, at the start of a new unit, so that their accurate conceptions can be validated and reinforced, and their misconceptions identified and corrected. Therefore, after reviewing the pre-viewing discussion questions provided for your class, create an "Everything We Know About..." list. Preview key vocabulary words and have students raise additional questions they hope will be answered by this program. Most importantly, students should be told that as "science detectives" they must listen closely, so that after viewing the program, they will be able to tell whether or not the facts/beliefs they put on their list were scientifically accurate.

After Viewing: After a brief discussion about the program, challenge your "science detectives" to prove or disprove the accuracy of the facts they put on their "Everything We Know About..." list. Discuss what else they learned and use the followup questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.

SCHLESSINGER
SCIENCE LIBRARY

Program Summary

The Earth has had the same basic water supply for millions of years — a supply that is constantly recycled by the sun through a process known as the water cycle. Even though three-fourths of the Earth's surface is covered by water, only a small portion of it is fresh water. If all of the water on Earth filled 100 large cups, only three of those cups would be fresh water. Of those three cups, only the amount in one eyedropper would represent the amount of fresh water found on the surface in lakes, rivers and streams! Most of the Earth's fresh water supply is frozen at the North and South Poles, and the rest lies underground. Because life on Earth cannot exist without fresh water, we all depend on the water cycle.

The water cycle has three stages. First, the sun's energy changes the liquid water in oceans, rivers, lakes and puddles into a gas called water vapor, which becomes part of the air. This is called evaporation. Evaporation occurs quickly when it is warm, but it happens even when it is cold outside. The second stage of the water cycle is called condensation. This happens when the water vapor in the air cools and turns from a gas back into a liquid. We see condensation in the form of clouds, which are actually made up of tiny water droplets. Condensation can also be seen on the outside of cold drinking glasses on a hot day. The third stage of the water cycle is called precipitation. The tiny water droplets in clouds combine and become larger until they become too heavy to stay up in the air and fall back to Earth in the form of precipitation, which is rain, sleet or snow. When the precipitation reaches the ground, the water cycle starts all over again with evaporation.

When salty water from the ocean evaporates, it becomes fresh water. When rain, sleet or snow falls, some of it freezes and is unusable by plants and animals. Some water collects in ponds and lakes. Much of the remaining precipitation ends up in the soil. Once the soil holds all the water it can, the rest runs into little creeks and streams that form large rivers, and eventually empties into the ocean. Because streams and rivers contain usable fresh water, many towns and cities are built next to rivers. Most of the rain that falls soaks deeply into the ground until it meets a solid layer of rock. This is called groundwater. Groundwater collects to a certain level, which we call the water table. People drill wells to tap this water, which is Earth's most important fresh water supply.

Water that finds its way underground can combine with a gas called carbon dioxide to form a weak acid that slowly dissolves certain rocks, leaving a hollow space called a cavern. The water drips into the cavern over time, carrying the dissolved rock which is slowly deposited again in solid formations called stalactites, which hang down from the ceilings of caverns, and stalagmites, which rise up from cavern floors.

Pollution is a major threat to the world's water supply. People are learning how to protect Earth's limited fresh water supply and have passed laws to prevent water on the surface and underground from sources of pollution, such as chemicals used in factories, homes and on farms.

Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the show.

water cycle — The never-ending process that recycles Earth's fresh water supply using energy from the sun. The water cycle has three stages: evaporation, condensation and precipitation.

evaporation — The part of the water cycle that changes liquid water into a gas called water vapor which becomes part of the air.

condensation — The part of the water cycle that changes water vapor into liquid droplets. Clouds are formed by condensation.

precipitation — The part of the water cycle that involves the tiny water droplets formed by condensation collecting into larger drops and falling back to Earth from the clouds. Precipitation can be in the form of rain, snow, sleet or hail.

reservoir — A lake formed by humans to use as a water supply.

groundwater — A pooling of water that collects underground after it soaks through the soil and reaches a layer of rock that prevents it from going any deeper. Most of the Earth's fresh water is groundwater. People use groundwater by drilling wells down into the ground from the surface.

water table — The underground area that is always soaked with groundwater. The water table rises or falls, depending on whether it loses or gains water.

carbonic acid — A weak acid formed when water combines with a gas called carbon dioxide. This acid slowly dissolves rock.

caverns — Open underground areas created when carbonic acid (water and carbon dioxide) dissolves away rock, leaving a hollow space where the rocks once were.

stalactites — Rock formations formed in caverns over millions of years by dripping water containing dissolved rock crystals like limestone. Limestone formations that dangle down from cavern ceilings are called stalactites.

stalagmites — Rock formations formed in caverns over millions of years by dripping water containing dissolved rock crystals like limestone. Limestone formations rising from cavern floors are called stalagmites.

pollution — Chemicals and wastes that poison the land, air and water. Pollution can be caused by many things: oil spills, animal waste, chemicals like fertilizers and insecticide sprays running from farmland into streams, people spilling waste into sewers and factories dumping trash into streams.

Pre-viewing Discussion

Before students generate their list of "Everything We Know About..." this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

- Where does the Earth's supply of water come from?
- Why does it rain?
- Where does the water go after it rains?

After the class has completed their "Everything We Know About..." list, and before watching the show, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

Focus Questions

You may wish to ask your class the following questions to assess their comprehension of key points presented in the program.

1. How much of the Earth's surface is covered by water?
2. How much of the water on Earth is fresh water?
3. Where is most of the Earth's fresh water found?
4. Is it true that the water on Earth today is the same water that was on Earth millions of years ago? How is that possible?
5. What is the process that recycles Earth's water?
6. What are the three stages of the water cycle?
7. How does evaporation work?
8. Does evaporation only occur when it is warm outside?
9. How does condensation work?
10. What makes a cloud? How is a cloud similar to the outside of a cold glass of juice on a hot day?
11. How does precipitation work?
12. What are the different forms of precipitation?
13. What happens to the salt in ocean water during the water cycle?
14. How can we prove that the salty water in oceans becomes fresh water during the water cycle?
15. What happens to the rain after it falls down to Earth?
16. Why are many towns and cities built near rivers?
17. Why do people build dams and reservoirs?
18. What is groundwater? Where does it come from?
19. How is it possible for people to use groundwater?
20. How does water create caverns? How are stalactites and stalagmites formed?
21. What is water pollution? What can be done to reduce water pollution?