UNIT OVERVIEW

Water, which is one of Earth's most important resources, covers three-quarters of Earth's surface. An appreciation for and understanding of Earth's water is important for students as consumers of this critically important resource. The Water unit explores the water cycle and the changes water undergoes as it moves through this cycle as well as the effects these changes have on Earth.

Certain reading resources are provided at three reading levels within the unit to support differentiated instruction. Other resources are provided as a set, with different titles offered at each reading level. Dots on student resources indicate the reading level as follows:

- low reading level
- middle reading level
- high reading level

THE BIG IDEA

Understanding the water cycle is crucial to understanding how what we do—polluting, farming, damming, using, wasting, and conserving—affects everyone's water.

Other topics

The unit also addresses topics such as: aquifers, how particles of sediment in water behave, rainy climates, different types of frozen water on Earth, the causes and effects of giant waves, ocean currents, and water conservation.

SPARK

The spark is designed to get students thinking about the unit's topics and to generate curiosity and discussion.

Materials

- glass of water
- 3–4 ice cubes
- food coloring

Activity

Place the ice cubes and the glass of water on a table or tray. Have students explore the properties of each.

What will happen to the ice if I leave it here for a long time? What will happen to the water if I leave it here for a long time? Will it disappear? What will happen if I put the ice in the water?

Add several ice cubes to the glass. Invite students to observe what happens.

Where does the water that forms on the outside of the glass come from?

Invite and accept all answers.

What will happen if I place food coloring in the glass of water?

Place 10 drops of food coloring in the glass.

What do you observe? Does this change your thinking about where the water on the outside of the glass comes from?

It is not important at this time for students to understand condensation or the fact that the water on the outside of the glass comes from water vapor in the air.

As an alternative to this activity, the *Water Cycle Model Process Activity* could be used as a spark.

Many of the unit's vocabulary terms are related to the spark activity and can be introduced during the spark. For vocabulary work, see the Vocabulary section in this *Unit Guide*.

PRIOR KNOWLEDGE

Discuss the concept of a cycle with students using a familiar cycle such as the seasons. Explain that cycles involve changes that keep repeating. Ask where clouds and precipitation come from. Discuss water usage in the home, where students think the water they use comes from, and where wastewater goes.

Probing Questions to Think About

Use the following questions to have students begin thinking of what they know about water.

- What happens to ice when it melts? Why does it melt?
- What happens to water when it freezes? What causes this to happen?
- What are some examples of cycles? Using these examples, describe a cycle.
- What do you think the term *water cycle* might mean?
- Where does the water that falls as rain come from? How does it get there?

Tell students they will learn more about these topics soon.

UNIT MATERIALS

Each unit provides a wide variety of resources related to the unit topic. Students may read books and other passages, work in groups to complete hands-on experiments and investigations, discuss science ideas as a class, watch videos, complete writing tasks, and take assessments.

Resources are available for printing or projecting, and many student resources are also available for students to access digitally on Kids A–Z.

Selected unit resources are available in more than one language.

For a complete list of materials provided with the unit, see the Water unit page on the Science A–Z website.

VOCABULARY

Use the terms below for vocabulary development throughout the unit. They can be found in boldface in the *Nonfiction Book*, the *Quick Reads*, and/or other unit resources. These terms and definitions are available on *Vocabulary Cards* for student practice. Additional vocabulary lists are provided in the teaching tips for *Investigation Packs* and *FOCUS Books*.

Core Science Terms

These terms are crucial to understanding the unit.

aquifer	an underground layer of rock, sand, or other material through which groundwater flows
condensation	the process by which water changes from a gas to a liquid state
delta	a triangle-shaped area of land formed by sediment at the mouth of a river
deposition	the act or process by which wind or water sets down sediment
erosion	the gradual wearing away of rock or soil by water, wind, or ice
evaporation	the change of water from a liquid state to a gas state, due to an increase in temperature
groundwater	water held underground in soil or rock, often feeding springs and wells
precipitation	water that falls from clouds in the form of rain, snow, sleet, or hail
runoff	excess water, not absorbed by the soil, that flows downhill
sandbar	a long ridge of sand formed in a body of water by currents or tides
sediment	particles of dirt and rock that are carried by water, wind, or ice and deposited elsewhere
surface water	water found above ground, on land
water	a clear liquid that forms oceans, lakes, rivers, and rain
water cycle	the path water takes, and the changes it goes through, as it cycles through the environment
water molecule	a small particle of water, made up of hydrogen and oxygen
watershed	the area of land that catches rain and snowmelt when it flows as runoff
water vapor	the gaseous state of water

Other Key Science Terms

The following vocabulary is not essential for comprehending the unit but may enrich students' vocabulary.

absorb	to soak up or take in
cloud	a visible group of water or ice particles in the atmosphere from which rain and other precipitation can fall
conservation	the preservation, protection, and restoration of natural resources
cycle	a regular series of events that keeps repeating
dam	a barrier that stops the flow of water
drought	a long dry spell with little or no rainfall; a water shortage caused by low rainfall
Earth	the third planet from the Sun in our solar system
energy	any force that provides power to create motion or action
flow	to move freely in one continuous mass
freeze	the change of water from a liquid state to a solid state due to a decrease in temperature
fresh water	water that is not high in salt content, found in most lakes, rivers, streams, and ponds
gas	a state of matter in which the molecules do not have a fixed volume or shape, and can expand freely
glacier	a large body of accumulated ice and compacted snow that is found year-round and slowly moves downhill
hail	frozen rain that falls from clouds
ice	frozen water; water in a solid state
irrigation	the practice of supplying water to land or crops to help growth
lake	a large body of surface water surrounded by land
liquid	a state of matter with a definite volume but not a definite shape, that falls and flows due to gravity
melt	how water changes from a solid state to a liquid state, due to an increase in temperature
ocean	the whole body of salt water that covers most of Earth, or one of the sections of this water
polar caps	areas of permanent ice that cover the north and south poles of Earth

pollution	dirt, waste, or debris in the air, in water, or on the ground
rain	liquid water that falls from clouds to the earth
river	a large stream of flowing water
salt water	water that contains salt, found in oceans and sometimes in lakes
sleet	partly frozen rain
snow	water vapor in the atmosphere that has frozen into ice crystals and falls to the ground in the form of flakes
soil	the top layer of earth in which plants grow
solid	a substance that keeps its shape
state of matter	the solid, liquid, or gaseous condition of a substance
stream	a small river or channel of water
temperature	the measurement of how hot or cold something is
thunderstorm	a storm with thunder, lightning, heavy rain, and sometimes hail
weather	a description of the temperature, cloudiness, rainfall, wind, and other conditions in the atmosphere
well	a deep hole that is dug into the ground to get water

Vocabulary Activities

You may choose to introduce all the terms that will be encountered in the unit before assigning any of the reading components. *Vocabulary Cards* with the key science terms and definitions are provided. Dots on the cards indicate the reading levels of the *Nonfiction Book* or the *Quick Reads* in which each term can be found. If all level dots appear, the term may come from another resource in the unit. Students can use these cards to review and practice the terms in small groups or pairs. The cards can also be used for center activity games such as Concentration.

The *Word Work* activity sheets offer fun puzzles and practice with key vocabulary terms from the unit. For further vocabulary practice and reinforcement, you can choose from the vocabulary *Graphic Organizers*. To build customized vocabulary lessons with terms related to the topic, see Vocabulary A-Z.

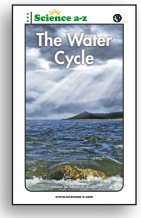
Students can use the *Word Smart* vocabulary *Graphic Organizer* to organize information on the science terms. You may want to assign each student one to three words to share his or her *Word Smart* knowledge with classmates. Students who have the same word should first compare their *Word Smart* sheets with each other and then report to the larger group.

The science terms can be used in oral practice. Have students use each term in a spoken sentence.

As students read, encourage them to create a science dictionary by recording new vocabulary terms and definitions in their *SAZ Journal*.

BACKGROUND AND MISCONCEPTIONS

Use this section as a resource for more background knowledge on unit content and to clarify the content for students if misconceptions arise. Refer to Using the Internet below for more ways to extend the learning.



Q: *I don't see water in the air except when it rains. Is there really water in the air?*

A: Yes. The air we breathe contains water. Water vapor is everywhere in the atmosphere, in addition to the liquid water that falls from clouds. The molecules of water in water vapor are too small to be seen, but they are there. Humidity is a measure of how much water vapor is in the air. Certain regions are more humid than others.

Q: *Are ice and clouds different forms of water? I thought water was only a liquid.*

A: Yes. Liquid water, solid ice, and water vapor are all forms of the same chemical compound, H_2O, which we call water. The term *water* also refers to the liquid state of H_2O.

Q: *If you went up high enough, could you sit on a cloud or touch it?*

A: No. Clouds are not solid. They are made of condensed water vapor, which means they are actually liquid water that is suspended in the atmosphere by the air beneath them.

Q: *What is ice made of?*

A: Ice is made of the same ingredient—water—before and after it melts. Students may not realize that the solid ice on Earth is counted as part of Earth's freshwater supply.

Q: *Why do we have to conserve water when three-fourths of Earth is covered in it?*

A: While there is plenty of water in the oceans, it is mostly salt water. In order to drink it and use it in our pipes and plumbing, we would have to desalinate it (remove the salt) and treat it. These processes are very expensive and time-consuming.

Q: *Is there a lot of water underground?*

A: Yes. Much of Earth's freshwater is stored in aquifers deep beneath the ground. In places where the aquifer is deep beneath the surface, wells are dug to extract water for human purposes. Some areas that have little or no surface water rely almost exclusively on groundwater for their water supply.

EXTENSION ACTIVITIES

Using the Internet

Most search engines will offer a wealth of options when *water* or a stage in the water cycle is entered. Adding the name of a state or region can narrow a search to include information on an area of particular interest to students (for example, Colorado water resources). Local water departments often have websites with useful information regarding local water resources. Be aware that some sites may not be educational or intended for the elementary classroom. More specific inquiries are recommended, such as:

- Where does water go?
- water conservation
- water recycling
- water resources
- water pollution
- groundwater

Projects and Activities

- **Research:** Using a map that shows any rivers, streams, creeks, or bodies of water in your area, have students trace the flow of water in their region and create a watershed map.
- **Research:** Have students research and compile a list of sayings or expressions that pertain to water. Examples include: "You're all wet," "It's water under the bridge," and "There is an ocean between us."
- **Math:** Analyze several water bills (be sure to remove any personal information) to determine water usage and dollars spent over several consecutive months. Have students plot the results on a graph. You could also give different bills to groups and have groups discuss the results of their analysis and compare differences in usage between residences. This activity can be expanded to include averaging and estimating exercises.
- **Guest:** Invite a hydrologist or meteorologist to visit the class to discuss his or her profession and how it relates to water.
- **Field Trip:** Plan a field trip to a water treatment plant, local dam, or reservoir.
- **Research/Home Connection:** Students can conduct research as a family/home project or in the library/media center to extend the learning about a topic in one of the *Quick Reads* or other unit resources.