



Earth Science

Water

Basic Level

Water Is in the Air

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FOR:

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Reading Activities

Water Is in the Air

What makes water so special?

CORE CURRICULUM STATEMENTS

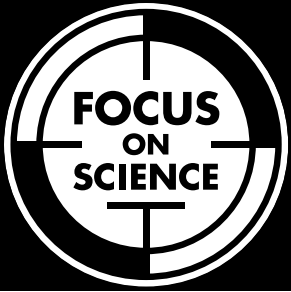
Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

Water is recycled by natural processes on Earth.

- evaporation: changing of water (liquid) into water vapor (gas)
- condensation: changing of water vapor (gas) into water (liquid)
- precipitation: rain, sleet, snow, hail
- runoff: water flowing on Earth's surface
- groundwater: water that moves downward into the ground

Plants and animals depend on each other and their physical environment.

Heat energy from the Sun powers the water cycle.



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What makes water so special?

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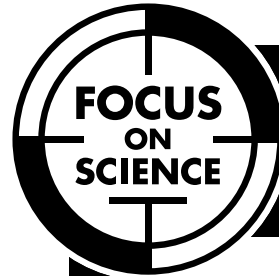
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by
Caitlin Scott



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– Predict –

*What do you think you will
learn from reading this book?*

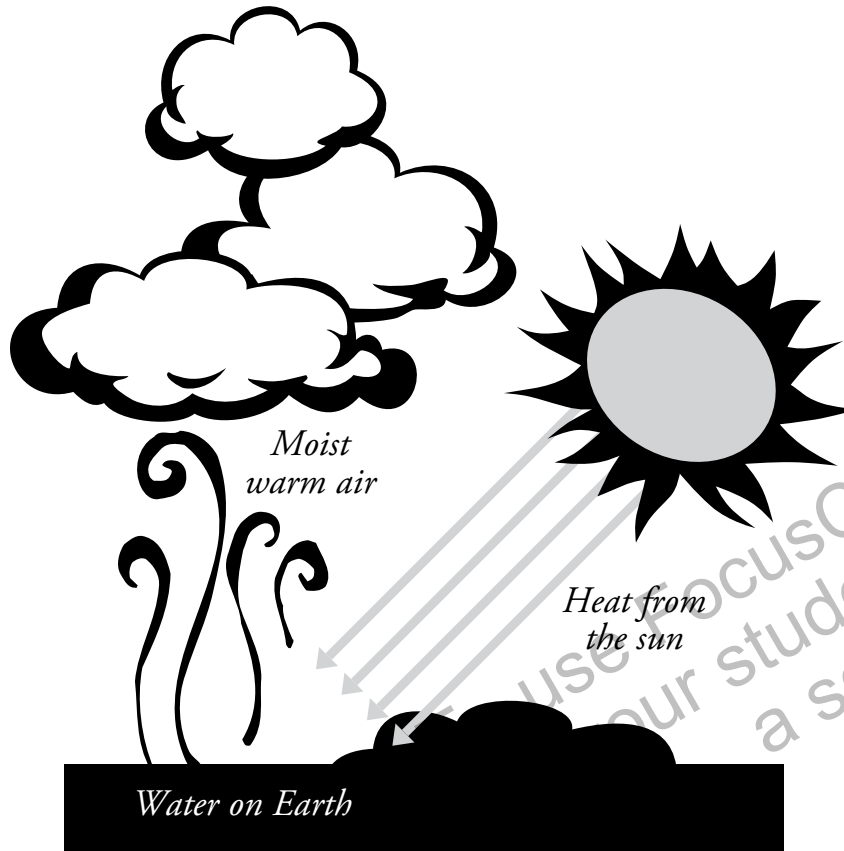
INTRODUCTION

Clouds Are Water

Air is all around us. We can't see air, but we know it is there. We breathe air to live. Air is made of **gases**. It also contains water **vapor**. How do we know?

Air rises and falls. As water vapor rises, it cools and tiny water drops form. When these drops are close together, we can see them. They form a cloud. A cloud is just water in the air.

Water goes up into the air and falls back to Earth all the time. This is called the water cycle. The sun's heat is the cause of this cycle.



Clouds form when warm, moist air rises off Earth's surface.

gases: matter that has no shape; gases spread out to fill the space around them; most cannot be seen
vapor: a gas formed from something that is usually a liquid

The Water Cycle

The water cycle has five parts.

Evaporation—Water changes to a gas and rises up into the air.

Transportation—Clouds are transported, or moved, by wind over land.

Condensation—The warm gas rises and moves over land. The air cools and the gas begins to change back to a **liquid**. Tiny water droplets form clouds.

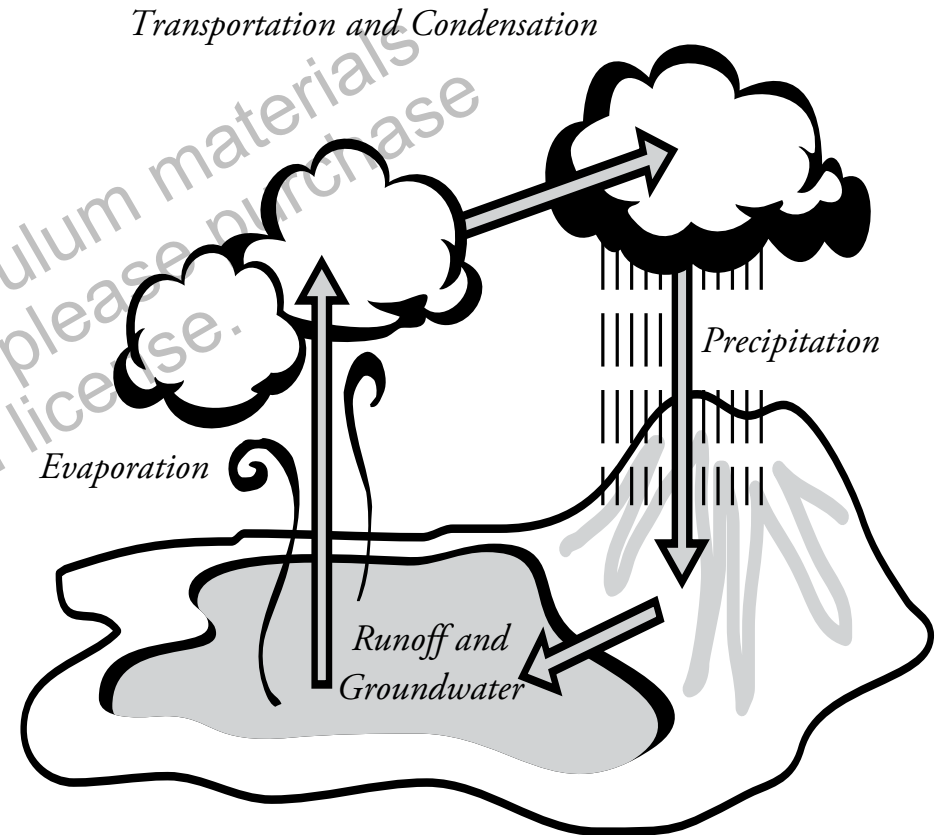
Precipitation—When there is enough water, it falls back to Earth.

Runoff and Groundwater—The water that falls collects on Earth. Some soaks into the ground.

Can you guess what happens next?

liquid: a state in which matter flows freely when poured; liquids take the shape of whatever holds them

Water Cycle



– Recall –

Name the five parts of the water cycle.

Evaporation

Evaporation occurs when water is warmed by the sun. The water changes from a liquid to a gas. As a gas, water moves up into the air.

Have you ever spilled water on your clothes? Did the water spot go away? Yes. Your clothes dried out. The water changed from a liquid to a gas. It evaporated. But you didn't see the water going into the air. Even though you can't see it, water evaporates all the time.



*When water boils, it turns from a liquid to a gas.
You can see the gas as steam.*

– Explain –

What causes water to evaporate?

Transportation

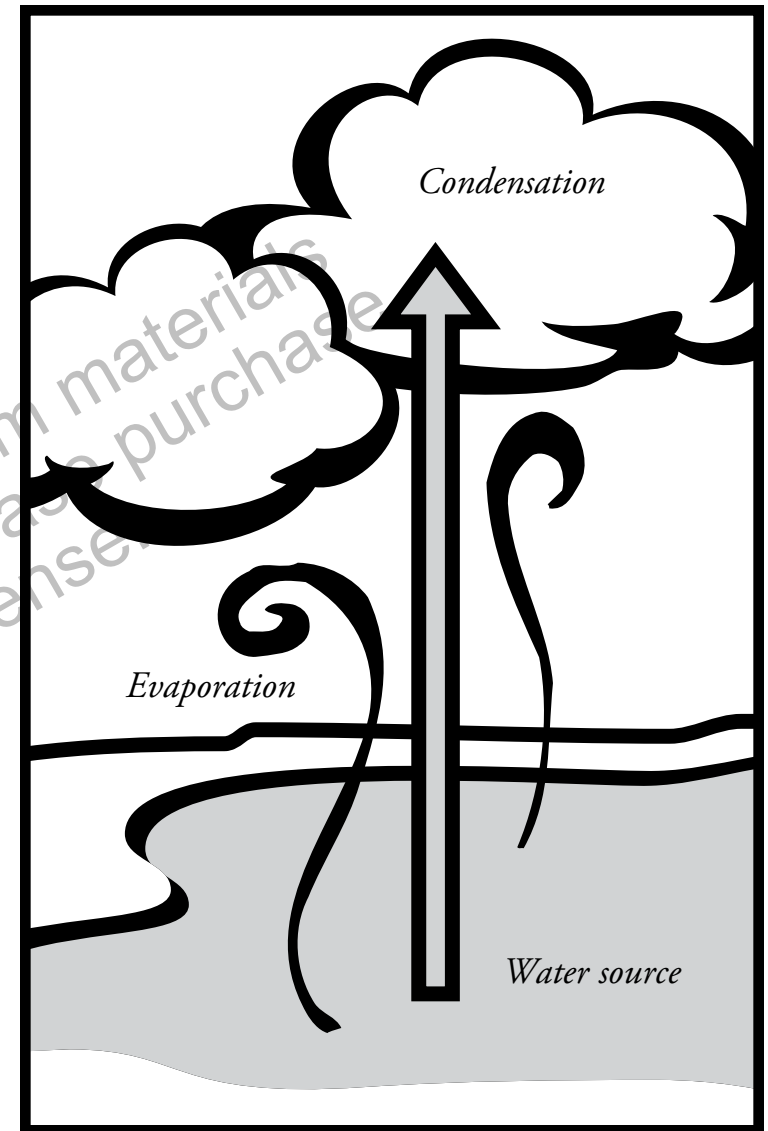
Most water is evaporated from bodies of water such as the ocean or lakes. Wind transports the water vapor toward land, which is higher than the water.

Condensation

Have you ever breathed on a cold window? Your breath made fog on the window. This is condensation.

Condensation occurs when water vapor is pushed higher and begins to cool. The vapor changes back to liquid water, forming a cloud. First, water evaporates; then it condenses. The condensation forms clouds.

What happens next in the water cycle? That's right—rain, snow, sleet, or hail.



– Explain –

What happens when water condenses?

Precipitation

Water can't stay in the air forever. As the clouds move higher, they get colder. More gas becomes liquid. The liquid water is heavier than water vapor. It falls back to Earth.

Rain

If it is warm outside, the water that falls is rain. Rain occurs at temperatures that are above freezing.

In some parts of the United States, it rains a lot. In other parts, it is very dry.

Average Rainfall in U.S. Cities	
City	Average Annual Rainfall in Inches
Astoria, Oregon	70
El Paso, Texas	8
Las Vegas, Nevada	4
Miami, Florida	60
New Orleans, Louisiana	60
Phoenix, Arizona	7

Snow

Snow is water that freezes in a cloud. As it falls to the ground, it stays frozen.

It snows a lot in the northern parts of the United States. It also snows a lot high up in the mountains.

Snowiest U.S. Cities	
City	Average Annual Snowfall in Inches
Blue Canyon, California	241
Marquette, Michigan	129
Sault Ste. Marie, Michigan	117
Syracuse, New York	112
Caribou, Maine	110

– Infer –
Why do scientists keep records of precipitation?

Sleet

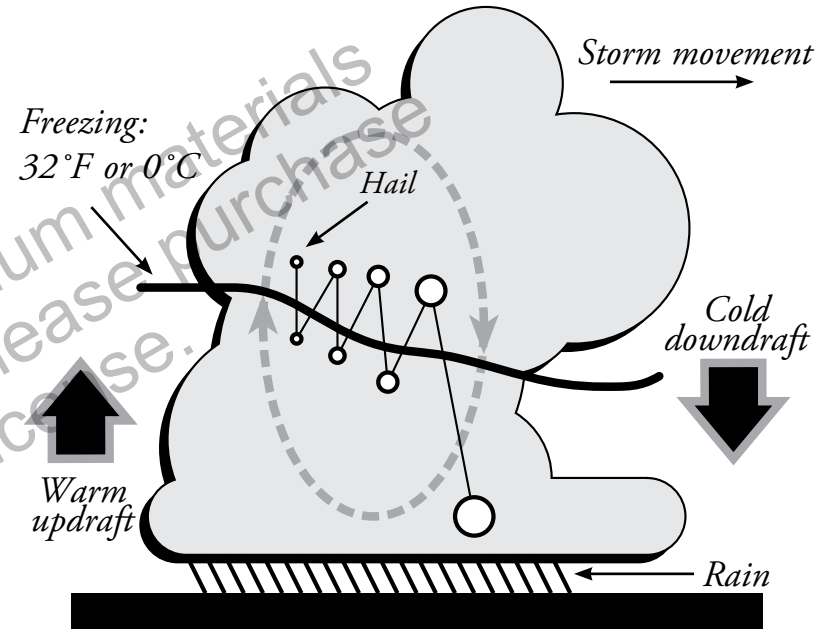
Sleet is also water that freezes in a cloud. But sleet doesn't stay frozen. It passes through warmer air and melts as it falls. Then it goes through colder air again. It refreezes just before it hits the ground.

Hail

Hail is a little like sleet. Water freezes in a cloud and falls through warmer air. The water starts to melt. But then, strong winds from a **thunderstorm** blow it back up to the colder air. It freezes again. This can happen many times. Each time, the frozen water gets larger. Finally, it gets too heavy to stay up and falls to the ground as hail.

thunderstorm: a rainstorm that has thunder and lightning

How Hail Forms



Hail moves up and down in a storm cloud. It grows larger and larger each time it passes through air that is above and below freezing.

– Summarize –

Describe how water changes from one state to another.

Runoff and Groundwater

The last step of the water cycle is runoff and groundwater. When water falls, it is collected and stored in the ground.

Then, it evaporates again.

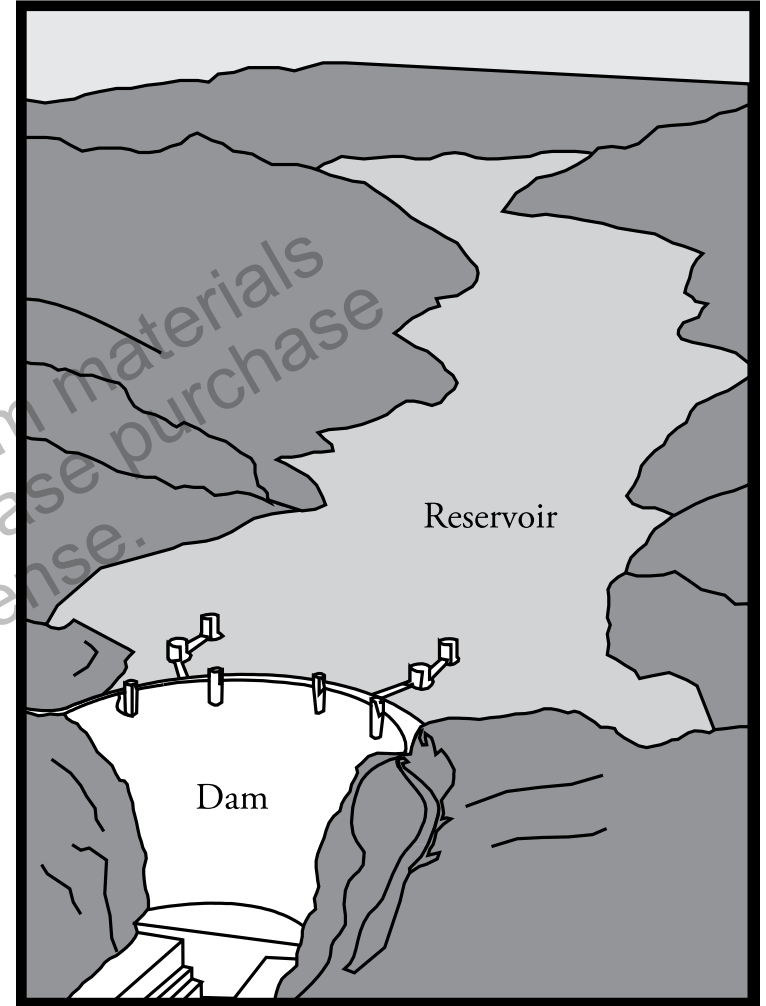
Water is stored on Earth in lakes, rivers, seas, or the oceans. Water is also stored underground.

Sometimes people collect water in **reservoirs**. Then, they clean the water and use it for drinking, cooking, and cleaning.

- Apply -

Describe evidence of the water cycle that you have seen.

reservoirs: places where water is stored



Lake Mead in Arizona and Nevada is a reservoir created by the Hoover Dam.

The Water Cycle Never Stops

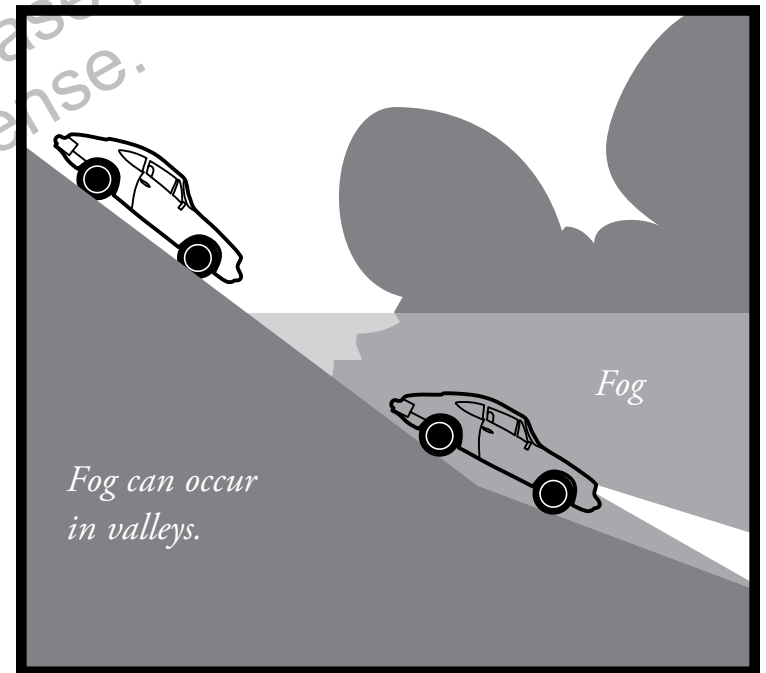
If you put evaporation, transportation, condensation, precipitation, and runoff and groundwater together, you have the water cycle.

The water cycle is going on right now because of heat from the sun. Just like air, we can't always see water. But, we know it's there. We can't live without it.

All living things depend on the water cycle. Plants need water to grow. Many animals, such as you, eat plants to survive. Without the water cycle, this food chain would not exist.

Did You Know?

Clouds don't have to be high up in the sky. Sometimes clouds can touch the ground. We call these clouds fog.



Try This

In this experiment, you can see the water cycle in a short period of time. You will be able to observe evaporation, condensation, and precipitation in just 10 minutes.

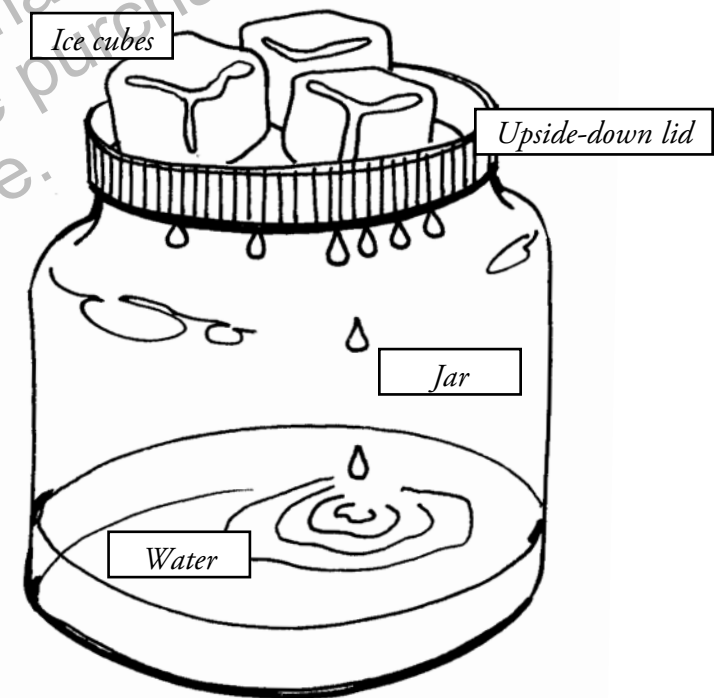
Materials

- 1 glass jar with a lid (metal lid preferred)
- 3 ice cubes
- hot water
- paper and pencil to record observations

What To Do

1. Pour hot water into the jar to a depth of one-half to one inch.
2. Turn the lid upside down and place it on top of the jar.
3. Place the three ice cubes on top of the lid.

4. Record what you see for the next 10 minutes.
5. After 10 minutes, take the lid off and observe the underside of the lid.
6. Record your observations again.



– Interpret –
 Explain the results of the data you collected.

Glossary

gases—matter that has no shape; gases spread out to fill the space around them; most cannot be seen

liquid—a state in which matter flows freely when poured; liquids take the shape of whatever holds them

reservoirs—places where water is stored

thunderstorm—a rainstorm that has thunder and lightning

vapor—a gas formed from something that is usually a liquid

To Find Out More . . .

Want to learn more about water?

Try these books

A Drop Around the World by Barbara McKinney Shaw. Dawn Publications, 1998.

The Magic School Bus Wet All Over by Pat Relf and Carolyn Bracken. Scholastic, 1996.

Access these Web sites

The National Weather Service
<http://www.nws.noaa.gov/>

The Environmental Protection Agency,
Office of Water
<http://www.epa.gov/water/>

Write for more information

The National Weather Service
1325 East West Highway
Silver Spring, MD 20910

U.S. Environmental Protection Agency
Office of Water (4101M)
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

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Assessments

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Check Understanding

Shade the circle next to the correct answer.

1. The water cycle is made up of five parts. In which part of the water cycle would you find reservoirs?
 - Ⓐ evaporation
 - Ⓑ precipitation
 - Ⓒ condensation
 - Ⓓ runoff and groundwater
2. What are clouds made of?
 - Ⓐ smoke
 - Ⓑ frozen water
 - Ⓒ drops of water
 - Ⓓ thunder and lightning
3. What causes the water cycle?
 - Ⓐ sun
 - Ⓑ weather
 - Ⓒ clouds
 - Ⓓ rain

4. The diagram below shows the water cycle.



What happens during evaporation?

- Ⓐ Water falls back to Earth.
- Ⓑ Water vapor changes to liquid.
- Ⓒ Water changes to gas and rises.
- Ⓓ Clouds are transported over land.

Check Understanding

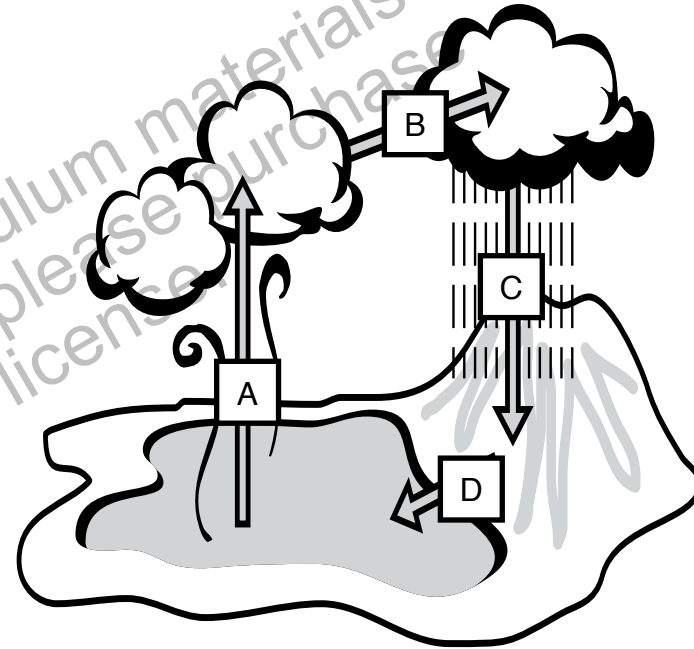
Shade the circle next to the correct answer or write your answer on the lines.

5. Identify **two** types of precipitation that occur when water freezes in a cloud. [1]

- 1) _____
- 2) _____

Explain how each forms. [2]

6. The diagram below shows the water cycle. The letters *A* through *D* represent four different processes taking place.



Which letter represents the process of condensation?

- Ⓐ A
- Ⓑ B
- Ⓒ C
- Ⓓ D

Assessment Scoring Guidelines

1. Answer D is correct.
2. Answer C is correct.
3. Answer A is correct.
4. Answer C is correct.

5. Sleet

Water freezes in a cloud, then melts as it falls through air, then freezes again.

Hail

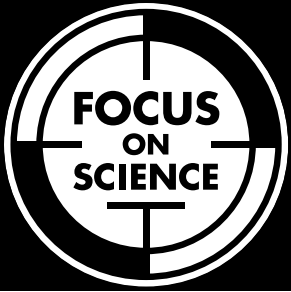
Water freezes in a cloud, then starts to melt but is blown back up into colder air many times.

Snow

Water freezes in a cloud and falls to Earth still frozen.

6. Answer B is correct.

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English Language Arts Activities

Water Is in the Air

Read for a Purpose

TRY THE SKILL

As you choose something to read, you usually have a purpose in mind, such as these:

- to gain or understand information
- to learn how to do something
- to gather information in order to form an opinion
- to be entertained

For example, you read this book to gain information about how water in the air affects your life. You also learned how to perform an experiment, so you had two purposes for reading.

As you look through books, magazines, and articles, think about your purpose for reading. Choose reading material that matches your purpose.

Read the description of each selection. Then identify its main purpose.

1. This selection tells why we need to keep pollution out of the air.
 - (A) to inform
 - (B) to tell how to do something
 - (C) to persuade
 - (D) to entertain

2. This selection tells how you can use evaporation to get salt from ocean water.
 - (A) to inform
 - (B) to tell how to do something
 - (C) to persuade
 - (D) to entertain
3. This selection tells about a time when all the water on Earth evaporated.
 - (A) to inform
 - (B) to tell how to do something
 - (C) to persuade
 - (D) to entertain
4. This selection tells how acid rain forms.
 - (A) to inform
 - (B) to tell how to do something
 - (C) to persuade
 - (D) to entertain

Identify Main Idea

TRY THE SKILL

The main idea is the most important point the author is trying to make. Every paragraph should have a main idea. For example, read this paragraph from the book.

Evaporation occurs when water is warmed by the sun. The water changes from a liquid to a gas. As a gas, water moves up into the air.

The main idea of this paragraph is—“Evaporation occurs when the sun warms water and changes it to a gas.”

Here is another. What is the main idea of this paragraph?

Air rises and falls. As air rises, tiny water drops form. When these drops are close together, we can see them. They form a cloud. A cloud is just water in the air.

“A cloud is just water in the air.”

To practice determining the main idea, read this paragraph below. Then write the main idea in your own words.

Condensation takes place when water in the air forms tiny water drops. It is the second step of the water cycle. First, water evaporates. Then it condenses. This forms clouds.

Choose another paragraph from this book to read. Then write the main idea of the paragraph on the back of this sheet of paper.

Context Clues

TRY THE SKILL

To figure out the meaning of an unknown word, look for words in the same sentence or nearby sentences that give you clues.

Look for word clues in each sentence at the right to figure out which word from the box should complete it. Then write the correct word on the line.

evaporated: water that changed from a liquid to a gas and rose in the air

gases: matter that has no shape; gases spread out to fill the space around them; most cannot be seen

liquid: a state in which matter that flows freely when poured; liquids take the shape of whatever holds them

condensed: water in the air that formed tiny water drops

reservoirs: places where water is stored

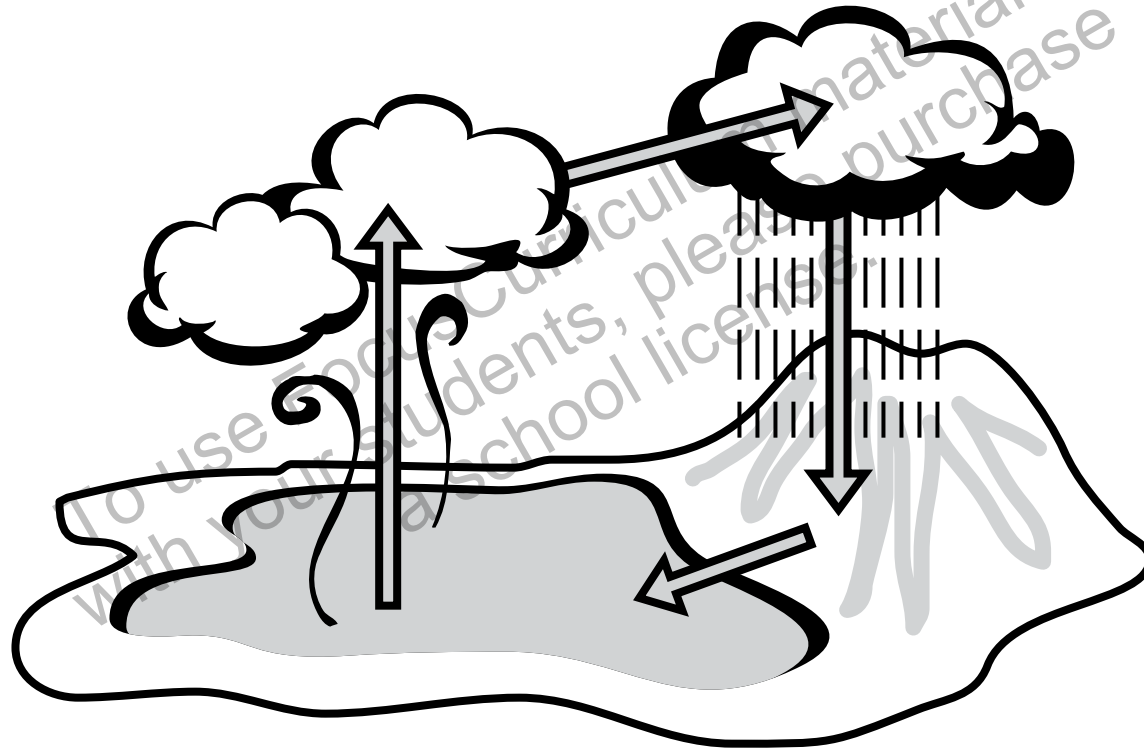
thunderstorm: a rainstorm that has thunder and lightning

1. He poured the _____ into the bottle and stored it on the shelf.
2. The farmer dug a large ditch in the ground to make a _____ to hold water.
3. All cars create _____, which spread out into the air.
4. The _____ passed through with heavy rain and lightning.
5. The water that I spilled from the glass _____ and spread out into the air.
6. My glasses fogged up when I went outside because the water _____.

Steps in a Process

TRY THE SKILL

Complete this diagram by writing each step in the water cycle in the appropriate place. Then explain each step.



Answer Key

Read for a Purpose

1. C
2. B
3. D
4. A

Identify Main Idea

Condensation takes place when water in the air forms tiny water drops.

Context Clues

1. liquid
2. reservoir
3. gases
4. thunderstorm
5. evaporated
6. condensed

Steps in a Process

