

Lesson 5: Precipitation (2 Days)

☐ Getting Started

The water cycle and weather are closely related. Watch the following video to review the water cycle. As you watch, use the "Water Cycle Notes" page to write definitions for the terms provided. You can pause the video as needed.



The Water Cycle for Kids

www.beyondthepage.com/link/13232/

Weather keeps the water cycle going, and water keeps weather cycles going. Water currents affect air temperatures, which create wind, and water is the reason we experience certain kinds of weather (like storms, precipitation, clouds, and fog).

You have seen how water evaporates to enter the air as water vapor and how water vapor condenses in the sky as clouds. Today you will learn about some different types of precipitation.

Stuff You Need

- "Weather Words" booklet (kit)
- *Weather and Climate* by Kathleen M. Reilly
- colored pencils
- colored pencils or watercolor paints* (Activity 1 - Option 2)
- empty two-liter bottle* (Activity 4 - optional)
- marbles or small rocks* (Activity 4 - optional)
- masking or painters tape* (Activity 4 - optional)
- permanent marker* (Activity 4 - optional)
- ruler* (Activity 4 - optional)
- scissors* (Activity 4 - optional)

Ideas to Think About

- How are the water cycle and weather connected?
- How does water cycle through the environment?
- What role does precipitation play in the water cycle?

Things to Know

- **Dew** is water vapor that has condensed on grass and plants.
- **Fog** is water vapor that has condensed in the air. It is a cloud that has formed at the Earth's surface rather than higher up in the atmosphere.
- A rain gauge is a tool that shows how much rain has fallen during a storm or during a specific day.

- Water storage refers to water stored both in the atmosphere (as water vapor) and on land (in oceans, lakes, groundwater, ice, etc.)
- Evaporation occurs when water turns into water vapor (a gas). Water evaporates from large bodies of water, moist soil, or even from ice and snow.
- Transpiration is a type of evaporation where water vapor is released from plants' leaves.
- Runoff is water (such as snow melt and rain) running off land and returning to water storage.
- Infiltration is a form of runoff; it is the process of precipitation being absorbed into the ground as groundwater and for use by plants.
- See the "Weather Words" booklet for definitions of the following words: condense, sleet, hail, drought, water cycle.

☐ Reading and Questions

Read pages 35-45 in the book *Weather and Climate*. Answer the following questions. As you read, fill in the definitions for the "Lesson 5" section of your "Weather Words" booklet.

1. What happens when water is heated by the Sun?

2. What causes clouds?

3. What happens when the drops of water in clouds become too heavy to stay in the air?

4. What is the difference between freezing rain and sleet?

Activities

☐ Activity 1: Amazing Precipitation

Precipitation has inspired great literature and artwork. In this activity, you will write a poem or descriptive paragraph about rain, ice, or snow (Option 1) or sketch or paint a precipitation scene (Option 2). Read over both options and choose one to complete.

Option 1: Writing about Precipitation

First, read the short selections on the "Precipitation Poems" page. Pay attention to the creative ways that the poets describe rain and snow. Next, write a short poem or descriptive paragraph about a rainy or snowy scene. (If you need inspiration for a scene, look at some of the links to precipitation artwork in Option 2.)

Consider jotting down descriptive words related to the five senses. How does your yard smell when it rains? How does the snow feel when it hits your cheek? What does rainfall sound like? Next, consider how you can describe the scene in a creative way. What can you compare it to? For example, "Like the tramp of hoofs" and "Like spangles dropped from the glistening crowd" are both similes that help the reader picture the sound or look of the precipitation. Once you've jotted down some ideas, write your short poem/descriptive paragraph.

Option 2: Precipitation Art

For this option, you will use colored pencils to sketch or watercolors to paint a rainy or snowy scene. For inspiration, scroll through the artwork at the following web links. Pay attention to the creative ways that some of the painters show or suggest rain (lines, streaks of gray, people with umbrellas, wet streets) or the colors and designs they use to paint snow. You may want to draw/paint the scene outside your window, imagining what it looks like while it's raining or snowing.

**Rain Paintings**www.beyondthepage.com/link/13233/**Winter Landscape Paintings**www.beyondthepage.com/link/13234/☐ **Activity 2: Mountain Weather**

For this activity, you will draw the different types of participation we experience on Earth on the "Mountain Weather" page. Draw a cloud and rain on the side of the mountain where it falls. Draw trees on the correct side of the mountain and dry rocks on the opposite side. Label the sides correctly as leeward and windward. You can refer to the image shown in the book on p. 43. Use a pencil and shading to make your drawings.

Weather Journal: Don't forget to fill in your weather journal for today.

Day 2☐ **Activity 3: My Environment's Water Cycle**

In this activity you will investigate the water cycle of your local environment. The water cycle has five main components: water storage, evaporation, condensation, precipitation, and runoff. Each of these components happens in different ways:

- Water is stored both in the atmosphere and on land.
- Water evaporates from large bodies of water, moist soil, or even from ice and snow, and is also released from plants in a process called *transpiration*.
- Water condenses out of the atmosphere as dew, fog, and clouds, and falls back to the ground as precipitation.
- *Runoff* describes the process of water returning to water storage through streams and rivers.
- *Infiltration* is a form of runoff; it is the process of precipitation being absorbed into the ground as groundwater and for use by plants.
- *Groundwater discharge* describes how water moves from underground storage to the surface.

Find the "My Environment's Water Cycle" activity pages. The first activity page provides a diagram of the water cycle. Use this page to review the many ways water

moves through the environment. On the second activity page, you will fill out a chart to identify components of the water cycle in your local area. Use the third page to draw a picture of the water cycle in your area at this time of year. The fourth page gives two examples of a local water cycle. Your picture should be similar to one of these.

☐ **Activity 4: Make a Rain Gauge (Optional)**

A rain gauge is a tool that measures rainfall. If you have the time and materials, follow the instructions on the "Make a Rain Gauge" page.

Wrapping Up

Today you reviewed the water cycle and what part the water cycle plays in weather. You also learned about the different types of precipitation in the environment and how they are formed.

Weather Journal: Record data in your weather journal for today.

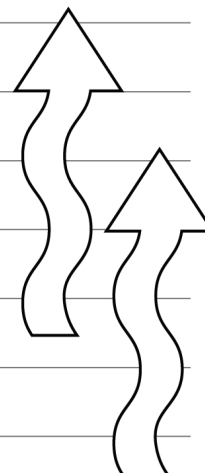
Water Cycle Notes

Directions: As you watch the video, write the definitions for the following words. Pause the video as needed.

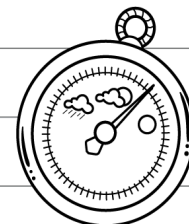
evaporation



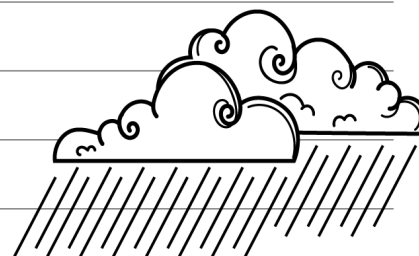
transpiration



condensation



precipitation



Precipitation Poems

A Drop fell on the Apple Tree –
Another – on the Roof –
A Half a Dozen kissed the Eaves –
And made the Gables laugh –

from "A Drop Fell on the Apple Tree" by Emily Dickinson

How it clatters along the roofs,
Like the tramp of hoofs
How it gushes and struggles out
From the throat of the overflowing spout!

from "Rain in Summer" by Henry Wadsworth Longfellow

Announced by all the trumpets of the sky,
Arrives the snow, and, driving o'er the fields,
Seems nowhere to alight: the whited air
Hides hills and woods, the river, and the heaven,
And veils the farm-house at the garden's end.

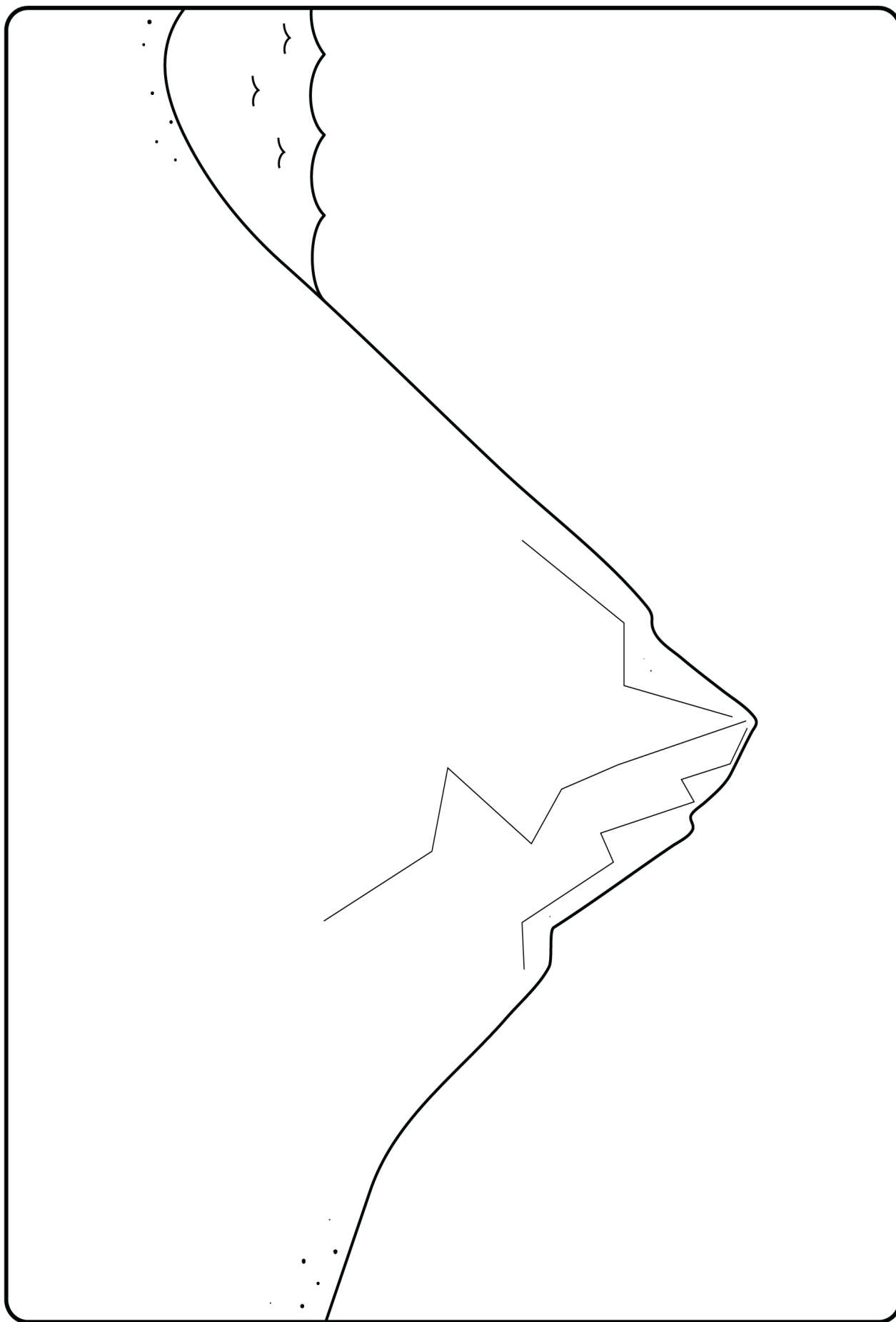
from "The Snow-Storm" by Ralph Waldo Emerson

Here delicate snow-stars, out of the cloud,
Come floating downward in airy play,
Like spangles dropped from the glistening crowd
That whiten by night the milky way...

from "The Snow-Shower" by William Cullen Bryant

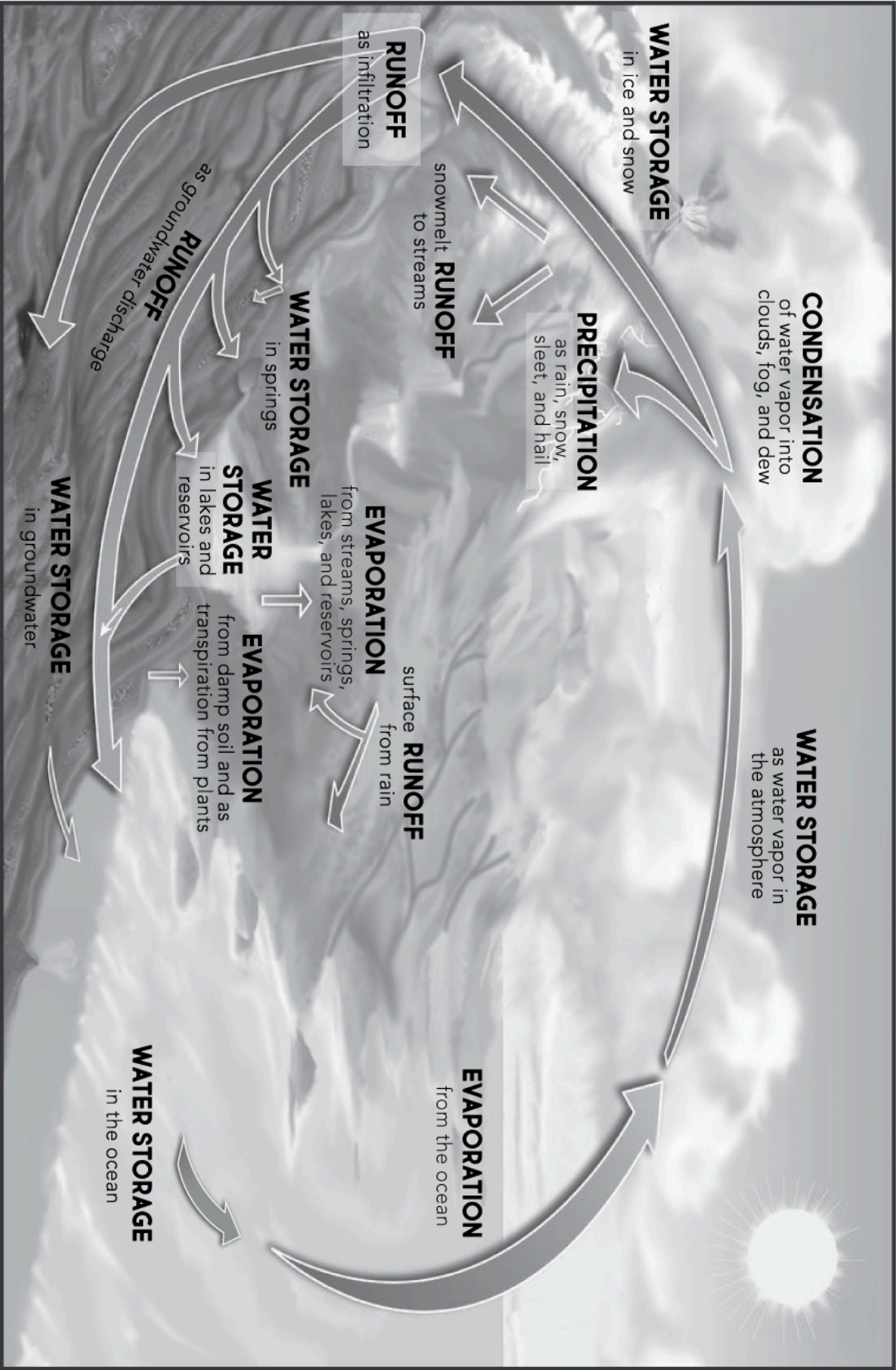


Mountain Weather



My Environment's Water Cycle

Directions: On the following page, draw a picture of the water cycle using the plants, bodies of water, and common types of condensation and precipitation in your area at this time of year.



My Environment's Water Cycle

Directions: Study the diagram of the water cycle on page 1, and read through examples of each part of the cycle in the chart below. Then identify specific examples of each component in your local or regional environment.

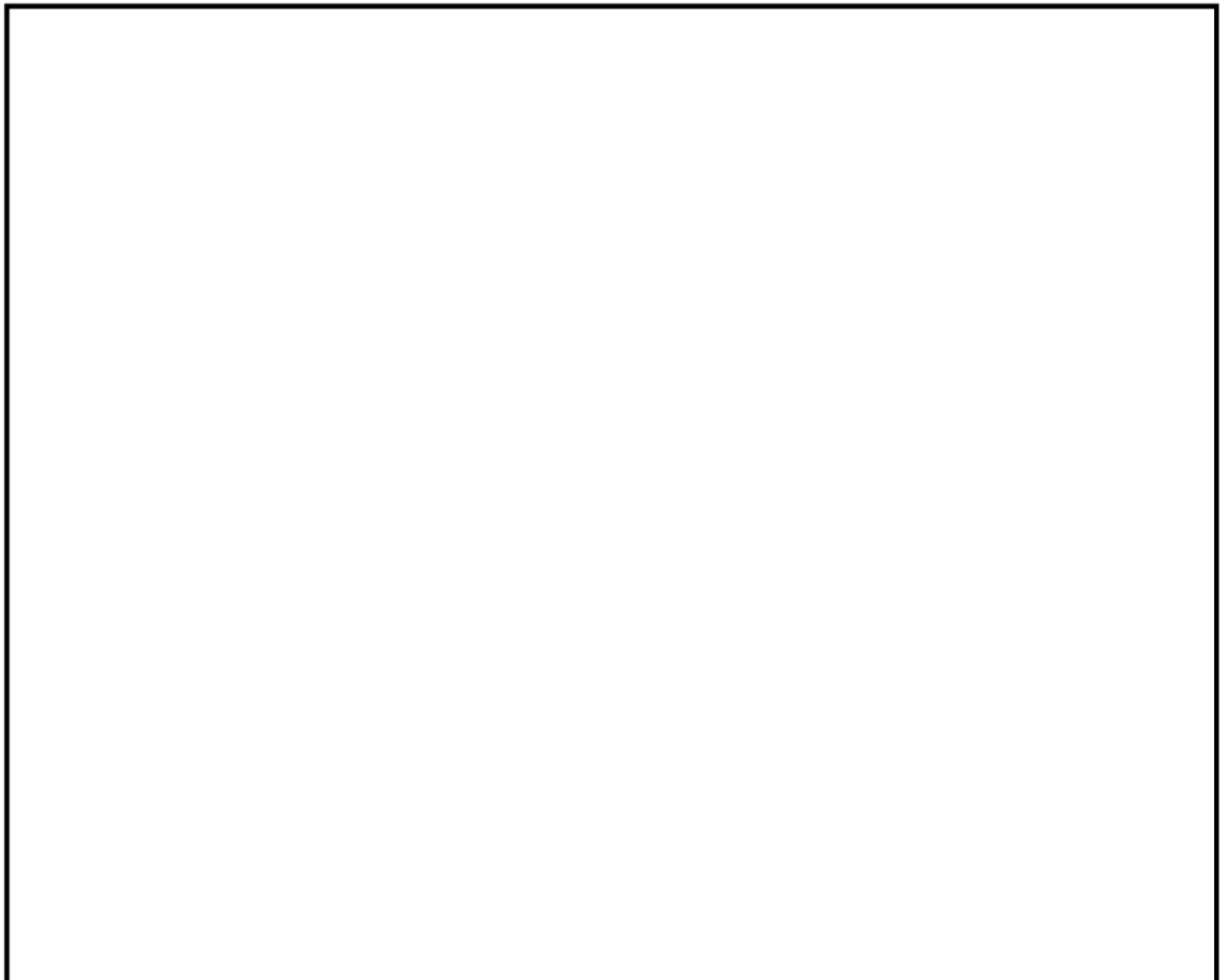
Water Cycle Component	Examples	How is this part of the water cycle represented in my environment at this time of year?
Precipitation	rain, snow, hail, or sleet	
Runoff	snow melt, rain runoff, ground water discharge, rivers and streams	
Water Storage (on Earth)	ice and snow, groundwater, oceans, lakes, reservoirs	
Evaporation and Transpiration	evaporation is when water from any source turns to water vapor; transpiration is when plants absorb water from the soil and release water vapor through their leaves	
Water Storage (in the atmosphere)	humidity	
Condensation	clouds, fog, dew	

My Environment's Water Cycle

Directions: Draw a diagram of the water cycle in your local or regional area. Don't worry about making your drawing accurate – concentrate on showing the components of the water cycle. If you need help identifying geographical features near you that influence the water cycle, try doing a Google search using your street address to see a map of your area.

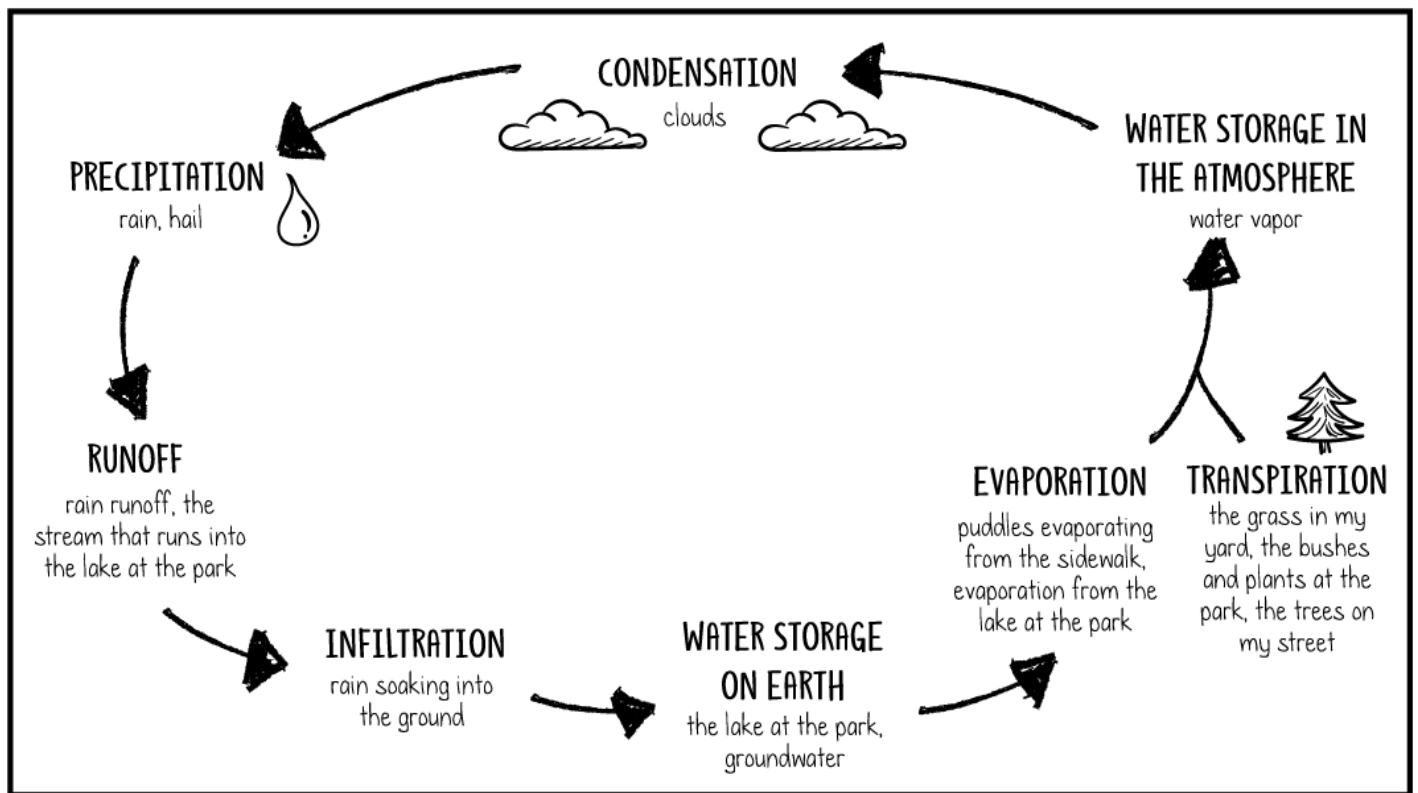
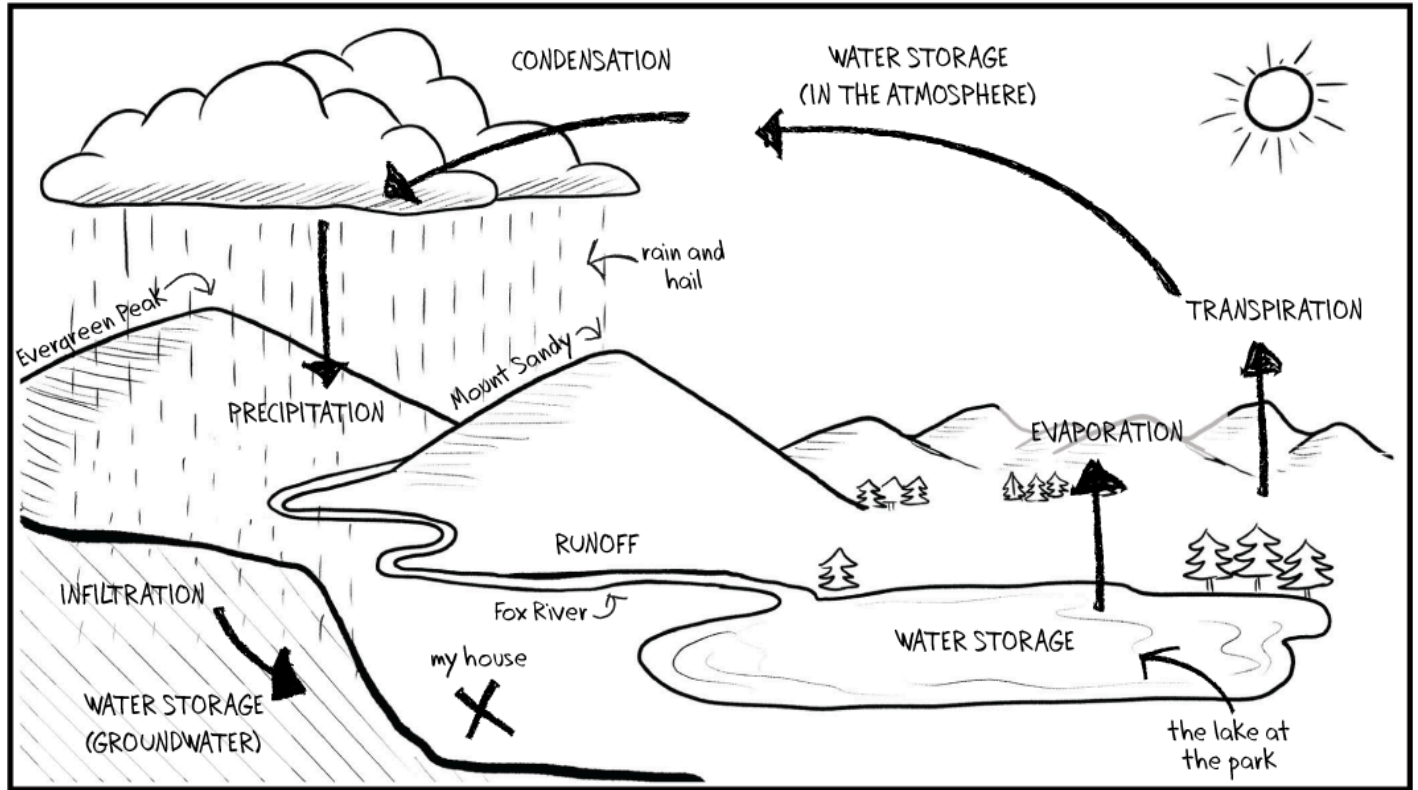
For examples of how to draw your diagram, see page 4. Follow these steps:

1. If you are drawing a picture, start by sketching any major geographic features in your area (bodies of water, mountains or hills, rivers, etc.).
2. Draw arrows and labels to show the parts of the water cycle: precipitation, runoff, infiltration, water storage on Earth, evaporation, transpiration, water storage in the atmosphere, and condensation.
3. Fill in the rest of your diagram with the examples you noted in your chart on page 2 (you can draw them so that your diagram is similar to the diagram on page 1, or use words to list your examples beneath each step of the water cycle).



A Local Water Cycle

Below is an example of a water cycle for an imaginary town and two ways you might draw it. Use these examples to help you draw your own local water cycle.



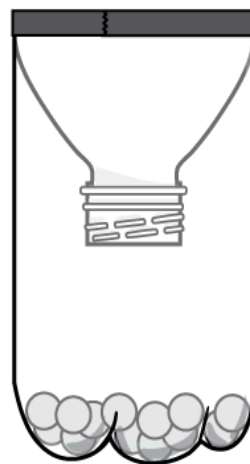
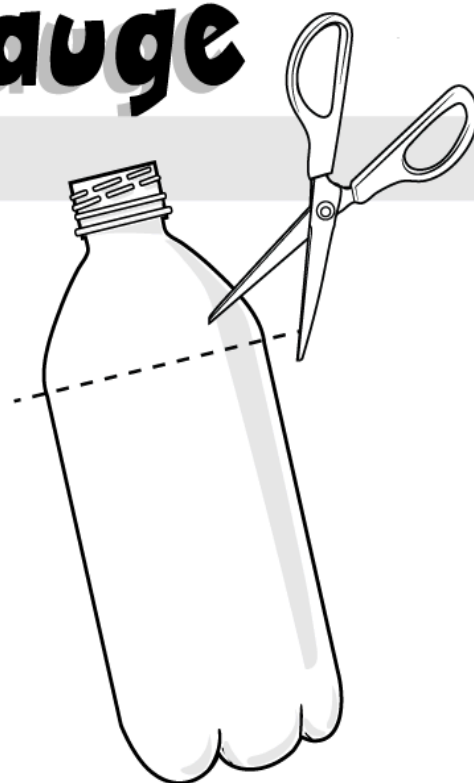
Make a Rain Gauge

Materials:

- two-liter bottle
- masking or painters tape
- scissors
- permanent marker
- marbles or small rocks
- ruler

Procedure:

1. Use scissors to cut off the top of the two-liter bottle (right below the curved area). Ask a parent to help with this step.
2. Place marbles or small rocks in the bottom of the bottle to help weigh it down.
3. Turn the top part of the bottle upside down and insert it into the bottom portion of the bottle. Line up the edges of the two pieces and tape them together using masking or painters tape.
4. Pour water into the bottle until it just covers the marbles or rocks. Use a permanent marker to draw a line at the water mark. Write "0" beside it.
5. Hold a ruler vertically with the 0 at the 0 mark on your bottle. Use the permanent marker to mark every $\frac{1}{4}$ inch up to 3 inches (or, if you prefer, mark every $\frac{1}{2}$ centimeter up to 8 centimeters).
6. When rain is in the forecast, set your rain gauge outside. Choose a spot that is secure (where it won't get knocked over) and out in the open (away from overhanging trees or anything that may block the rain). Also be sure that water is filled to the 0 mark.
7. Keep the rain gauge out all day. If it has rained, check the water level and record your measurement in the Precipitation section of your weather journal.



Lesson 5: Precipitation (2 Days)

Getting Started

Today, your child will explore the role of precipitation in the water cycle and how it connects to the weather we experience every day. He will learn about different types of precipitation, including rain, snow, sleet, hail, and freezing rain, and how they form under different conditions. He will deepen his understanding of how water moves through the environment and influences climate. By the end of the lesson, he will be able to describe the water cycle, identify types of precipitation, and explain their impact on weather patterns.

As your child does today's reading, he will fill in the definitions for the "Lesson 5" section in his "Weather Words" booklet. His definitions should be similar to the following:

- condense: when a substance changes from a gas to a liquid
- sleet: snowflakes that have partially melted and refrozen into ice pellets that bounce off the ground
- hail: rain that has frozen into lumps of ice
- drought: a long period of time with little to no rain
- water cycle: the way water constantly moves from the atmosphere, to land, and back to the atmosphere

✿ Ideas to Think About

- How are the water cycle and weather connected?
- How does water cycle through the environment?
- What role does precipitation play in the water cycle?



Things to Know

- **Dew** is water vapor that has condensed on grass and plants.
- **Fog** is water vapor that has condensed in the air. It is a cloud that has formed at the Earth's surface rather than higher up in the atmosphere.
- A rain gauge is a tool that shows how much rain has fallen during a storm or during a specific day.
- Water storage refers to water stored both in the atmosphere (as water vapor) and on land (in oceans, lakes, groundwater, ice, etc.)
- Evaporation occurs when water turns into water vapor (a gas). Water evaporates from large bodies of water, moist soil, or even from ice and snow.
- Transpiration is a type of evaporation where water vapor is released from plants' leaves.
- Runoff is water (such as snow melt and rain) running off land and returning to water storage.
- Infiltration is a form of runoff; it is the process of precipitation being absorbed into the ground as groundwater and for use by plants.
- See the "Weather Words" booklet for definitions of the following words: condense, sleet, hail, drought, water cycle.

⦿ Skills

- Plan and implement comparative and descriptive investigations by making observations, asking well defined questions, and using appropriate equipment and technology. (S)

Introducing the Lesson

So far your child has looked at how water vapor hangs in the air as humidity and condenses in the sky as clouds. This lesson will help your child understand how water is forced out of cooling air or more humid air to form dew, fog, or precipitation.

Reading and Questions

1. What happens when water is heated by the Sun?

It evaporates.

2. What causes clouds?

Water vapor rises high in the air and condenses, forming water drops or ice crystals that stick together.

3. What happens when the drops of water in clouds become too heavy to stay in the air?

It rains or snows.

4. What is the difference between freezing rain and sleet?

Freezing rain is rain until it hits a surface, freezes, and sticks to the ground. Sleet is rain pellets that freeze in the air and it bounces off the ground when it hits the surface.

Activities

Activity 1: Amazing Precipitation

In this activity, your child will reflect on precipitation in a creative way. In Option 1, she will write a poem or descriptive paragraph about rain, ice, or snow. In Option 2, she will sketch or paint a precipitation scene. Encourage her to read over both options and then choose one to complete.

Option 1: Writing about Precipitation

Your child will read short poem selections about precipitation and then write a short poem or paragraph that describes a rainy or snowy scene. Encourage her to use as many of the five senses as possible and to try to describe the rainy or snowy scene in a creative way. Optionally, she can use the precipitation artwork linked to in Option 2 for inspiration.

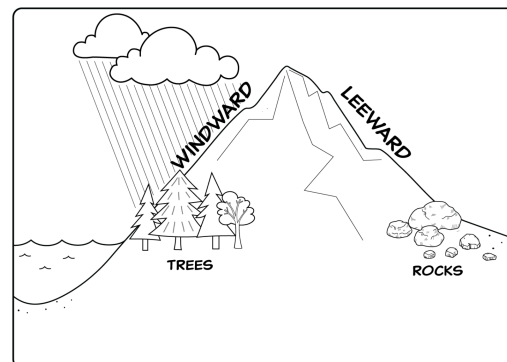
Option 2: Precipitation Art

For this option, your child will look at paintings of snowy and rainy scenes and then either sketch a precipitation scene using colored pencils or paint one using watercolors. Encourage her to pay attention to the creative ways that the artists depict rain and snow. She may want to draw/paint a scene outside her window, imagining what it looks like while it's raining or snowing.

Activity 2: Mountain Weather

Your child will draw different types of precipitation, add trees and rocks to the image, and label the sides of the mountain. He can refer to the image on p. 43 of the book. The "Mountain Weather" answer key is to the right.

Be sure that your child fills in his weather journal for today.



Day 2**Activity 3: My Environment's Water Cycle**

Your child will look at the water cycle and tie it to features of your environment. Help him fill out the chart if needed. He can concentrate on your local area, or on the water cycle of his larger region (for example, if you live an hour or two from mountains or a large body of water, he may want to illustrate a regional water cycle). His drawing should focus on illustrating components of the water cycle; it isn't meant to be a detailed map of your area. When your child is done, review his drawing and ask him why he chose each feature to represent precipitation, runoff, water storage, evaporation, and condensation.

Activity 4: Make a Rain Gauge (Optional)

If your child has the time and materials, encourage her to make her own rain gauge. Assist her as needed with cutting the two-liter bottle. When rain is in the forecast, she should place the rain gauge outside in a secure area where it won't be disturbed or knocked over. It should also be open to the sky (i.e., away from overhanging trees, porches, etc.). She should fill the bottle to the "0" line before beginning. As with other readings, your child's rain amount may differ from those provided on a weather report due to regional variations in the amount of rain.

Wrapping Up**Questions to Discuss**

- Describe the stages in the water cycle. (The water cycle has five main components that keep water moving through the environment. First, water collects in places like oceans, lakes, and rivers—this is called water storage. When the sun heats up this water, it turns into water vapor and rises into the air through evaporation. As the water vapor cools high in the sky, it changes back into tiny droplets to form clouds in a process called condensation. When the clouds get heavy, the water falls back to the ground as rain, snow, or hail, which is called precipitation. Finally, the water flows over the land in streams and rivers, called runoff, and returns to oceans and lakes, where the cycle starts all over again!)
- Name the different types of precipitation. (Snow, rain, sleet, freezing rain, and hail)
- What causes a drought? (A high-pressure system gets stuck, and the air is only pushed down (not up). When air doesn't rise, it does not rain. If this pattern persists for weeks or years, it becomes a drought.)
- How does the size of a mountain affect the climate on its different sides? (A big mountain can change the climate on its different sides because of how it blocks wind and rain. When warm, wet air moves toward the mountain, it rises and cools, causing rain to fall on the windward side. This side is usually green and full of plants because it gets a lot of rain. After the air loses most of its moisture, it moves over the mountain and down the other side, called the leeward side. This side is much drier because there is little water left in the air. The dry area behind the mountain is called a rain shadow, where deserts or dry grasslands often form.)

Things to Review

Review the definitions from today's lesson as well as the parts of the water cycle.