

Lesson 6: The Water Cycle

☐ Getting Started

Take a moment and think about this: The water you drank this morning...Where was it before it reached your glass? Was it always in a bottle or a sink? Or was it once part of a cloud...floating high in the sky? Maybe it fell as rain in another state or even another country. Maybe it flowed through a river, soaked into the ground, or moved through a plant.



Water doesn't stay in one place for long.

It is always moving, changing form, traveling through the air, across land, and back again. In this lesson, you're going to explore how that movement works. You'll read about the water cycle, build your own working model, and then test how changes, like heat from the Sun, affect how quickly water moves through the system. By the end, you won't just know the steps of the water cycle, you'll understand how and why it keeps going, all the time, everywhere on Earth.

Stuff You Need

- *Water: The Story of the Hydrosphere, Second Edition* by Lynne Z. Petkovic, M.Ed., J.D.
- blue food coloring (kit)
- large zip lock bag (kit)
- permanent marker (kit)
- tape

Ideas to Think About

- How does water move continuously through Earth's systems?

Things to Know

- The **water cycle** is the continuous movement of water on Earth as it changes form—evaporating into vapor, forming clouds, and falling back as rain or snow
- **Evaporation** is the process by which liquid water changes into water vapor and enters the atmosphere.
- **Condensation** is the process by which water vapor (gas) cools and changes back into liquid water, forming clouds.
- **Precipitation** is any form of water that falls from clouds to Earth, such as rain, snow, sleet, or hail.
- **Transpiration** is the process where water is taken in by plant roots, transported to its leaves, and released back into the atmosphere

- **Infiltration** is the process by which water soaks into the ground and enters the soil.
- **Percolation** is the process by which water moves downward through soil and small spaces in rock due to gravity

☐ Reading and Questions

Read Chapter 6 in the book *Water: The Story of the Hydrosphere*. Then, answer the questions.

1. What is evaporation?

2. How are infiltration and percolation different?

3. How do the Sun and gravity work together to keep the water cycle moving?

Activities

☐ Activity 1: The Water Cycle

In the video at the following link, you'll explore the water cycle and discover how water continuously moves through Earth's systems. As you watch, pay attention to how water changes form through evaporation, condensation, and precipitation, and how energy from the Sun and gravity help keep the cycle moving. You'll also see how water travels between the atmosphere, land, and bodies of water as part of one connected system. Watch the video and then answer the questions on the activity page titled "The Water Cycle."

**The water cycle | Weather and climate**www.beyondthepage.com/link/13443/☐ **Activity 2: Build It and Speed It Up**

Today, you are building and using a model to show how water moves through Earth's systems. First, you are going to make your own mini water cycle inside a bag. The **water cycle** is the continuous movement of water on Earth as it changes form—evaporating into vapor, forming clouds, and falling back as rain or snow. In this activity, you'll see how water evaporates, turns into clouds, and falls back as rain— just like it does in nature.

Part 1: Build Your Water Cycle

1. **Draw the Water Cycle:** Use a permanent marker to draw the water cycle on one side of the Ziplock bag. Include a body of water (like an ocean or lake) at the bottom. Draw arrows rising from the water to represent evaporation, clouds near the top of the bag to represent condensation, and raindrops falling from the clouds to represent precipitation. You may use the diagram in Chapter 6 of *Water: The Story of the Hydrosphere* for ideas, but your model does not need to look exactly the same.
2. **Add Water:** Fill the bag with about 1/4 cup of water and add a few drops of blue food coloring to make the water more visible.
3. **Seal the Bag:** Seal the bag tightly so no water can escape. Make sure the air inside is left undisturbed for the process to work properly.
4. **Place in Sunlight:** Use a small piece of tape to attach the bag to a sunny window so it hangs upright. The bag should be vertical so that water droplets can form near the top and slide downward, modeling precipitation. The warmth from the Sun will cause evaporation and condensation inside the bag. The warmth from the sun will cause the water inside to evaporate, and you'll be able to see condensation forming on the inside of the bag.
5. **Observe the Cycle:** After 1-2 hours, water droplets will begin to form on the inside of the bag and slide down— this simulates precipitation! Observe and answer the questions on the "Build It and Speed It Up" Activity Page.

Part 2: Speed Up the Cycle

Now that your model is working, it's time to experiment. The Sun provides the energy that causes evaporation, and gravity pulls water back down as precipitation. By changing conditions, you are testing how energy affects the movement of water

through Earth's system. Your goal: Change one condition to see if you can make the water cycle happen faster.

1. Choose One Change to Test

Try one of the following:

- Move the bag to a sunnier location
- Tilt the bag slightly
- Start with slightly warmer water (with adult help)
- Other ideas?

2. Observe Again

Watch what happens after your change:

- Do droplets form faster?
- Do they fall sooner?
- Does anything look different?

3. Compare Your Results

Think about how your change affected the system and answer the questions on the "Build It and Speed It Up" activity page.

Wrapping Up

In this lesson, you didn't just learn about the water cycle; you watched it happen, tested it, and explained it. You saw how water changes form, moving from liquid to gas and back again. You discovered how energy from the Sun causes water to evaporate and how gravity pulls it back down to Earth. Most importantly, you explored how all of these parts work together as one continuous system. But the journey of water doesn't stop when it reaches the ground. Once water falls as rain, it begins to shape the land around it, breaking down rocks, carrying sediments, and slowly changing Earth's surface over time. Next up, you'll explore Weathering and Erosion and discover how moving water plays a powerful role in shaping the world you see around you.

THE WATER CYCLE



1. Explain how water moves through the water cycle. Include evaporation, condensation, and precipitation.

2. What causes water to change from a liquid into a gas during evaporation? _____

3. What causes water vapor to change back into liquid water during condensation? _____

4. How does energy from the Sun keep the water cycle moving? _____

5. How does gravity help move water through the water cycle? Give at least two examples. _____

6. After precipitation falls to Earth, what are two different places the water can go? _____

7. What would happen to the water cycle if there were no energy from the Sun? Explain your reasoning.

8. Why is the water cycle considered a continuous system instead of a series of separate events? _____

BUILD IT AND SPEED IT UP

Part 1: Observing Your Water Cycle Model



1. What happens to the water after the bag is placed in sunlight?

☐ It stays the same ☐ It disappears ☐ It spreads out in the bag ☐ Other: _____

2. Where do you first notice water droplets forming? _____

3. What happens to the droplets over time? _____

4. Match what you observed to the correct process:

Water warms and changes into vapor •

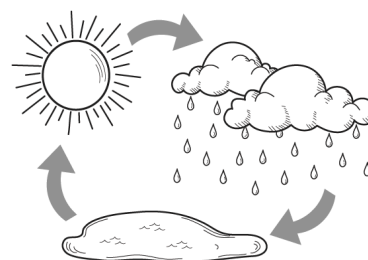
Water cools and forms droplets •

Water droplets fall down •

• evaporation

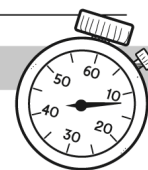
• condensation

• precipitation



5. In your own words, describe what is happening inside the bag. _____

Part 2: Speeding Up the Cycle



6. What change did you test?

☐ Moved to sunnier spot ☐ Tilted the bag ☐ Used warmer water ☐ Other: _____

Circle the correct answer.

7. The water droplets formed **slower/quicker** and appeared **sooner/later**.

8. The water cycle happened **faster/slower/stayed the same**.



9.

Complete the sentence.

The water cycle in my bag changed when I _____ because _____.

10. What is causing the water to move through the cycle in your bag? _____

11. How is your bag similar to the real water cycle on Earth? _____

Lesson 6: The Water Cycle

Getting Started

✿ Ideas to Think About

- How does water move continuously through Earth's systems?



Things to Know

- The **water cycle** is the continuous movement of water on Earth as it changes form—evaporating into vapor, forming clouds, and falling back as rain or snow
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Reading and Questions

1. What is evaporation?

Evaporation is the process by which liquid water changes into water vapor (a gas) when it gains energy from the Sun.

2. How are infiltration and percolation different?

Infiltration is the process by which water soaks into the ground and enters the soil. Percolation happens after infiltration and is the process of water moving downward through layers of soil, sand, and rock beneath Earth's surface.

3. How do the Sun and gravity work together to keep the water cycle moving?

The Sun provides the energy for evaporation and transpiration, moving water into the atmosphere. Gravity pulls water back to Earth as precipitation and causes it to flow across land and through the ground. Together, these forces keep water moving through the water cycle.

⦿ Skills

- Develop and use a model to describe how water cycles through Earth's systems, driven by energy from the Sun and the force of gravity. (MS-ESS2-4)
- Construct an explanation based on evidence for how water changes state (evaporation, condensation, precipitation) as it moves through the water cycle. (MS-ESS2-4)
- Develop and use models to explain how water moves between the atmosphere, land, and bodies of water. (Science & Engineering Practice)
- Analyze and interpret observations from a model to determine how energy from the Sun affects the rate of evaporation. (Science & Engineering Practice)

- Construct explanations to describe how gravity influences the movement of water, including precipitation and collection. (Science & Engineering Practice)
- Analyze and interpret patterns in the water cycle to explain how it functions as a continuous system. (Science & Engineering Practice)

Introducing the Lesson

In this lesson, your child will explore how water continuously moves through Earth's systems in a process known as the water cycle. He will learn how water changes form—evaporating into the air, condensing into clouds, and returning to Earth as precipitation. Through reading, hands-on modeling, and video analysis, he will move beyond simply identifying the steps of the cycle to understanding how and why it works. He will also investigate how energy from the Sun and gravity drive this system, helping him build a deeper understanding of how water moves through the environment.

Activities

Activity 1: The Water Cycle

In this activity, your child will watch a short video to deepen his understanding of the water cycle and connect it to the model he created. As he watches, he will focus on how water moves through the system, how it changes states, and how energy from the Sun and gravity drive these processes. He will answer questions that go beyond simple recall, asking him to explain how and why the water cycle works as a continuous system. He will also make connections between the video and his bag model, helping him use a model to describe how water cycles through Earth's systems.

Answer Key:

1. Water evaporates from Earth's surface and becomes water vapor. The water vapor cools and condenses into clouds. Water then falls back to Earth as precipitation, where it collects and the cycle begins again.
2. Energy from the Sun warms the water, causing liquid water to change into water vapor.
3. Water vapor cools and loses energy, causing it to condense into tiny liquid water droplets.
4. The Sun provides the energy needed for evaporation. Without this energy, water would not move into the atmosphere and the cycle would not continue.
5. Gravity pulls precipitation from clouds to Earth's surface. Gravity also causes water to flow downhill as runoff into rivers, lakes, and oceans.
6. Answers may vary. Water may flow into rivers, lakes, or oceans as runoff, soak into the ground through infiltration, be absorbed by plants, or collect in bodies of water.
7. Evaporation would slow down or stop because water would not receive enough energy to change into water vapor. As a result, the water cycle would slow down dramatically or stop.
8. The processes are connected and depend on one another. Water continuously moves through evaporation, condensation, precipitation, collection, and other pathways in a repeating cycle.

Activity 2: Build It and Speed It Up

In this activity, your child will create a mini water cycle model using a Ziplock bag to observe how water evaporates, condenses, and precipitates. This hands-on experiment will help him visualize the water cycle and understand how these processes work together to move water through the environment. The bag should stay in the sunny window for at least 1–2 hours for noticeable evaporation and condensation to occur. However, leaving it for a full day or longer will allow him to see the complete process of water

droplets forming and falling, simulating the full water cycle. The warmer and sunnier the spot, the faster the process will happen.

In Part 2, he will take on the role of a scientist by changing one condition, such as increasing sunlight or starting with warmer water, to see how it affects the speed of the water cycle. This encourages him to think about how energy from the Sun drives evaporation and influences how quickly water moves through the system.

Answer Key:

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. It spreads out in the bag (the water evaporates and moves into the air inside the bag) 2. On the inside surface of the bag, especially near the top or sides 3. The droplets get bigger and eventually slide down the bag 4. Water warms and changes into vapor → evaporation
Water cools and forms droplets → condensation
Water droplets fall down → precipitation 5. The water heats up, turns into vapor, forms droplets on the bag, and then falls back down | <ol style="list-style-type: none"> 6. One of the following should be selected:
Moved to sunnier spot
Tilted the bag
Used warmer water
Other reasonable change 7. The droplets formed faster and appeared sooner on the bag 8. Faster (for sunnier/warmer conditions) 9. Answers may vary 10. Energy from the Sun (heat) causes the water to evaporate, and gravity pulls the water down 11. Answers will vary. The bag model demonstrates the same water cycle processes that occur on Earth, including evaporation, condensation, precipitation, and the continuous movement of water through a system. |
|--|--|

Wrapping Up

In this lesson, your child explored the water cycle by reading, building a model, and analyzing how water moves through Earth's systems. He developed an understanding of how water changes states and how energy from the Sun and gravity drive this continuous cycle. In the next lesson, he will build on this understanding by exploring weathering and erosion, learning how moving water shapes Earth's surface over time.

Questions to Discuss

- What are the main processes in the water cycle, and what happens during each one? (Answer: The main processes are evaporation (water turns from liquid into gas), condensation (water vapor cools and forms liquid droplets), precipitation (water falls back to Earth as rain, snow, sleet, or hail), and transpiration (plants release water vapor into the air).)
- How do energy from the Sun and gravity work together to keep the water cycle going? (Answer: The Sun provides energy that causes water to evaporate and rise into the atmosphere. Gravity pulls water back down to Earth as precipitation. Together, they keep water moving continuously through the cycle.)

Things to Review

- Review the "Things to Know" from Lessons 1-6.