

Learning Objective: The Water Cycle

NGSS Standard: (MS-ESS2.C-4) Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.

Objective:

Students will be able to:

1. Explain the process of the water cycle.
2. Explain the terms associated with the water cycle.
3. Explain the function of the components of the water cycle.
4. Explain the major components needed for the water cycle

Time Required: 90 minutes

Materials Needed:

- Teacher computer with internet access
- Projector/Smartboard/document camera/reader
- 1 computer/laptop/iPad per student with internet access
- Water Cycle handout (attached)

The amount of materials listed below will vary based on whether the engage activity is done as a demonstration or the students are working in groups of 4 - 5.

- A large, transparent bowl
- A small glass
- thin plastic wrap; such as "Saran Wrap"
- A small weight
- A cup of hot water
- A cup of ice cubes/shavings
- Safety goggles

Teacher Preparation:

1 Create Playlist 1, a 25-minute [playlist](#) in [Legends of Learning](#) with the following games found in the

Water Cycle learning objective (in order):

- *Water Cycle*
- *The Water Cycler*

2 Create Playlist 2, a 15-minute [playlist](#) in Legends of Learning with 5 [assessment questions](#) from the

Water Cycle learning objective.

3 Make copies of the Water Cycle handout (1 per student).

Engage (20 minutes):

- The engage activity can be done as a demonstration, if the class size allows and a document camera/reader is available. The document camera/reader will allow the teacher to project what he/she is doing at their laboratory table/teacher desk/demonstration table.
- In addition, if proper safety protocols are taken, students may work in groups of 4 - 5 to complete this activity.
- *Note: Using ice shavings/small ice cubes will speed up the condensation process.*

- 1 Since hot water and possible glassware are being utilized, safety goggles are to be used.
- 2 Pour the hot water into the small glass, then place the small glass of hot water into the

middle of the bowl.

3 Cover the bowl with plastic wrap and place the weight into the middle of the thin plastic wrap above

the glass. The weight will cause the plastic wrap to sink down a small amount.

4 Place the ice shavings onto the plastic wrap and spread it so it covers the top.

5 Students observe the changes that take place as the process of condensation occurs (it can take a

couple of minutes).

7 The teacher will ask students, "What is the source of energy for this model of the water cycle?"

- ANSWER: The hot cup of water inside the bowl.

8 The teacher will ask students, "How does this activity model the process of condensation?"

- ANSWER: The water droplets forming at the top of the plastic wrap, inside the bowl, is an example of condensation.

9 The teacher will say, "We have just demonstrated a portion of the water cycle. Today we will learn more about the water cycle. Think about this demonstration during today's lesson as we will refer back to it at the end of class."

Explore (25 minutes):

1 Have your students [sign in to Legends of Learning and enter your teacher code](#).

2 [Launch](#) Playlist 1 to your students.

3 As students complete *Water Cycle*, students should fill out the Water Cycle handout.

- Based on your students' needs, the word bank may be left in or removed.

4 Assist students as needed during game play, pause playlist if you need to address content or questions to entire class.

Explain (15 minutes):

1 Review answers to Water Cycle Handout by drawing diagrams on the board or using the Smartboard.

2 Relate student knowledge to demonstration at the beginning of class.

- Which item was the source of energy? (*The hot cup of water.*)
- Was evaporation occurring? (*Yes, hot water from the cup was evaporating.*)
- Since evaporation is not visible, how do you know that evaporation was occurring? (*As the hot water rose, it came into contact with the cooler plastic wrap and began to condense.*)
- Was condensation visible? (*Yes, water droplets formed on the plastic wrap.*)
- What event modeled precipitation? (*As the water droplets became larger, they began to fall back into the pool of water in the bowl.*)
- Did percolation occur? (*Since the water is not being filtered through rocks, percolation did not occur in this water cycle model.*)
- Did crystallization occur? (*Since there was not any formation of ice inside the bowl, crystallization did not occur.*)

Elaborate (15 minutes):

1 Explain to students that the drinking water that is available on Earth has been around since dinosaurs inhabited the earth.

2 Show students this [short video](#) on the water cycle.

3 The teacher will ask the students, "What components are needed to make the water cycle function?"

- ANSWER: water, the Sun's energy in the form of heat, and gravity.

Evaluate (15 minutes):

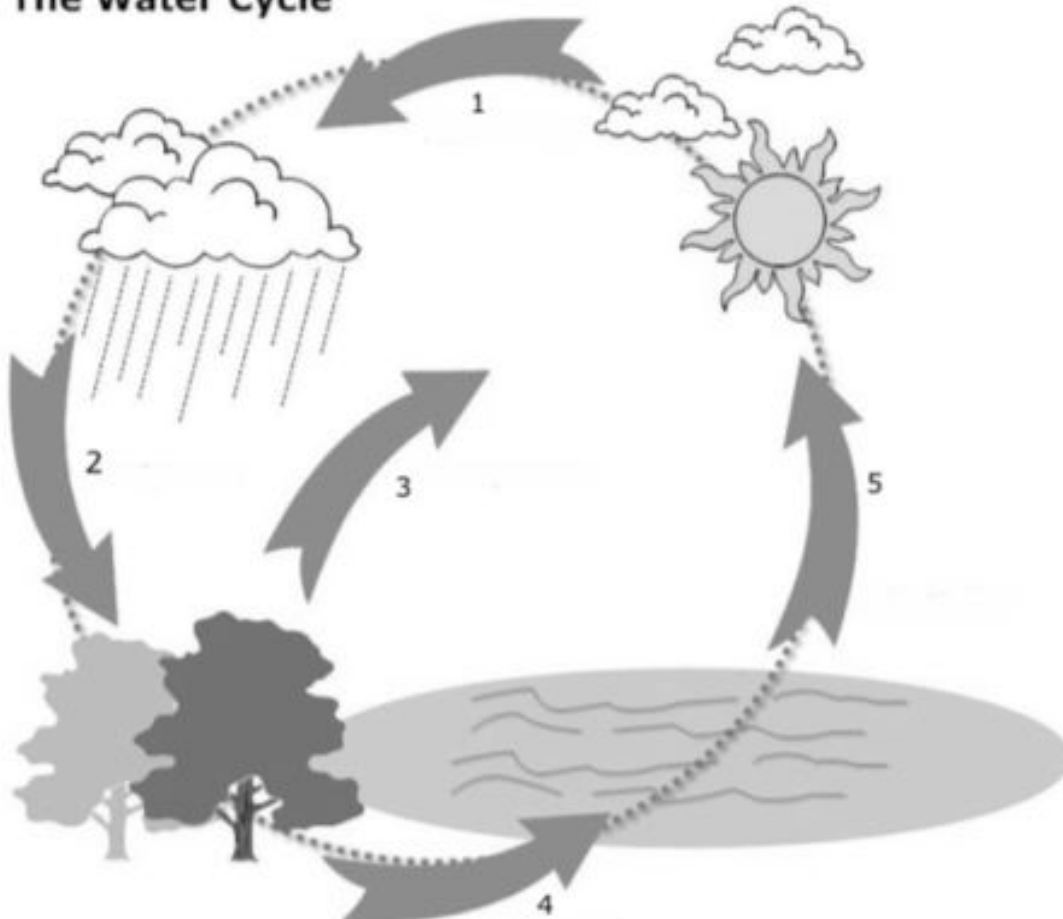
- 1 [Launch](#) Playlist 2 to your students. When they finish the assessment questions, any time left is freeplay.
- 2 [Analyze student results](#) to determine what concepts need to be a focus for reteaching.

Water Cycle

Name: _____

Directions: While playing the first game in Legends of Learning called *Water Cycle*, use what you learn to complete the diagrams and answer the questions below.

The Water Cycle



Word Bank: percolation, evaporation, precipitation, condensation, transpiration

6 What makes water an interesting chemical compound?

- A** Water can exist as a liquid.
- B** Water can exist as a solid (ice).
- C** Water can exist as a gas (vapor).
- D** All of the above.

7 What is the driving force for the water cycle?

- A** The gravitational force of the Moon.
- B** The gravitational force of the Sun.
- C** The heat from the Sun.
- D** The heat from the Moon.

8 Evaporation is the process which --

- A** a gas is converted into a liquid.
- B** a liquid is converted into a gas.
- C** a solid is converted into a liquid
- D** a solid is converted into a liquid.

9 What happens to air as it rises into the atmosphere?

- A** The air heats up.
- B** The air cools down.
- C** The air temperature remains constant.
- D** None of the above.