



# LESSON PLAN

## WATER CYCLE GRADES 6-8

### SUMMARY

Students develop and use a model of the water cycle to describe the processes and forces driving the cycling of water on Earth, including how the process of condensation forms clouds.



**MS-ESS2-4.** Develop a model to describe the cycling of water through Earth's systems driven by energy from the Sun and the force of gravity.

#### Science & Engineering Practices

#### Connections to Classroom Activity

##### Asking Questions

- Students write down questions in their notebooks when models of the water cycle are shared by group members.

##### Planning and Carrying Out Investigations

- Students collect observations and/or temperature readings during an investigation of water droplets condensing on the outside of a cup of ice water.

##### Constructing Explanations and Designing Solutions

- Students individually construct an explanation in their notebooks that compares cloud formation with the formation of water droplets on the outside of a cup of ice water.

##### Developing and Using Models

- Students develop a model of the water cycle, including the relationship between the water cycle and condensation of water droplets on the outside of a cup of ice water.

Disciplinary Core Ideas	Connections to Classroom Activity
<p><b>ESS2.A Earth Materials and Systems</b></p> <p>All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the Sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms.</p> <p><b>ESS2.C The Roles of Water in Earth's Surface Processes</b></p> <p>Water continually cycles among land, ocean, and atmosphere through transpiration, evaporation, condensation, crystallization, and precipitation as well as downhill flows on land.</p> <p>Global movements of water and its changes in form are propelled by sunlight and gravity.</p>	<ul style="list-style-type: none"> <li>• Students watch the Generation Genius video on the water cycle.</li> <li>• Students develop a model of the water cycle to help explain the relationship between the water cycle and condensation of water droplets on the outside of a cup of ice water.</li> </ul>
Cross Cutting Concepts	Connections to Classroom Activity
<p><b>Cause and Effect</b></p> <p><b>Systems and System Models</b></p>	<ul style="list-style-type: none"> <li>• Students explain what causes the water droplets to form on the outside of the glass.</li> <li>• Students include cause-and-effect relationships in their models.</li> <li>• Students develop models of the water cycle and a cup of ice water that forms water droplets on the outside because of condensation.</li> </ul>

## DURATION

90 min.



## ENGAGE

Students watch the [video of clouds moving and forming](#) in the sky.

Ask students to make observations in their notebooks while watching the video and write them down in their notebook. Play the video more than once. Have students move into pairs to share their observations with a partner. Students should begin by sharing with their partners their initial ideas that may explain their observations. Encourage students to draw in their notebooks to help communicate their ideas.

While students are talking to their partners, facilitate the discussion by asking guiding questions such as the following:

## MATERIALS

**Each student needs a notebook.**

**Groups of students need the following items:**

- 2 beakers or cups
- Ice
- Room temperature water
- Poster paper for modeling
- Thermometer (for extension activity)

- What did you notice about the movement of the clouds?
- What did you notice about the formation of the clouds?
- How do you think this was happening?



## EXPLORE

Provide each pair of students with the materials needed to investigate condensation on the outside of a glass of ice water. Fill one beaker or cup with ice, and then add room temperature water. Fill the second beaker or cup with room temperature water only.

Have students create a data table in their notebook and make observations every 30 seconds for each beaker or cup. After 10 minutes or after there is ample condensation on the cup with the ice water, tell students to stop collecting observations. Ask students to analyze their data and write several sentences to summarize what they observed.



## EXPLAIN

Bring the class back together and have several students share what they observed with the whole class. Now have students individually draw a model in their notebooks to explain the phenomenon of condensation forming on the outside of the glass of ice water.

Move students into small groups and have each student share their models. As each student shares, ask the rest of the group members to write down questions in their notebook that need to be clarified in order to better explain this phenomenon.

As students are sharing their models, facilitate the discussion by asking guiding questions such as the following:

- Where do you think the water droplets that formed on the outside of the glass came from?
- What are the similarities and differences between the two cups?
- What do you think causes the water droplets to form on the outside of the glass?

*End of Day 1*

Review with students what was observed during the Engage and Explore phases. Ask students to share a few of their questions with the whole class.



## WATCH THE GENERATION GENIUS WATER CYCLE VIDEO AS A GROUP



## ELABORATE

After watching the video, move students into small groups to draw a model of the water cycle. Use the vocabulary terms provided to label the parts of the model, and ask students to include descriptions of the cause-and-effect relationships. Once the group water cycle model is complete, have students add to their models a cup of ice water to show how the condensation of the outside of the cup relates or fits into the model of the water cycle. Have students talk to one another to help make sense of how these two models converge.

Bring students back together to share their group models with the class. Ask students guiding questions in order to come to a class consensus on the following science ideas:

- The cooling of water vapor in the atmosphere is the cause of cloud formation and the water droplets on the side of the glass of ice water.
- Decreasing temperature due to rising altitude is the cause of condensation that forms clouds.
- Decreasing temperature due to ice water is the cause of condensation that forms on the outside of the cup.

After sharing models and coming to a class consensus, have students individually construct an explanation in their notebooks that compares cloud formation with the formation of water droplets on the outside of a cup of ice water.



## EVALUATE

There are multiple ways to assess your students' understanding of this topic. The exit ticket is an opportunity for students to use the science ideas they built in the lesson in a new context. Alternatively, you can use the Kahoot! quiz (which provides downloadable scores at the end of the game) and/or the paper quiz. All these resources are located right below the video in the assessment section.



## EXTENSION

Provide students with thermometers to collect data on the temperature readings that help to form condensation on the side of the cup of ice water. Have students [read an article on types of clouds](#) and then explain how altitude affects the locations where different types of clouds are formed.

