

Developing & Using Models

Activity #2: Create Your Own Water Cycle

This activity is used to simulate how to develop and use models in the classroom.

Objective: Students will learn the water cycle and different states of matter.

Background: Water enters the watershed from a three stage cycle that starts when water falls from the sky in a process called precipitation. Precipitation begins when water vapor molecules become too large and heavy to remain in the atmosphere (in the form of clouds) and fall to the ground in the form of rain, snow, sleet or hail. Once precipitation has fallen to the ground, it is collected in large bodies of water such as lakes, ponds, rivers and oceans. Water at the surface of these bodies of water heats up under the sun and evaporates. Evaporation occurs when water transforms from a liquid into a gas, rising up toward the sky. Next, evaporated water condenses in the atmosphere. Condensation transforms water from a gas into a vapor and becomes suspended in the atmosphere; this is visually represented by clouds.

Materials:

- Water Cycle Diagram (Transparency)
- Large piece of paper
- Small paper squares
- Clear plastic cups
- Ice cubes
- Electric tea kettle
- Water
- Plastic wrap
- Bucket

- Science Notebook
- Pencil

Prep: Create Transparency from Water Cycle Diagram

Procedure:

1. Display the Water Cycle Transparency to the class. Ask students to draw a model of the water cycle in their science notebooks.
2. Fill plastic cups halfway with water and place one cup on the student's desk. Explain to the students that this is liquid water, representing the rain and lake water in the picture of the water cycle.
3. Boil water in the kettle. Explain to the students that the steam is water in the form of gas called water vapor.
4. Give each student some ice cubes and explain to the students that this is water in a solid state. Have them put the ice cubes in their cup of water.
5. Let the ice sit for a few minutes.
6. When the cups start "sweating" explain to the students that this is condensation and ask what is causing the sweating.

Modeling Investigation:

Materials:

- Large, empty, well cleaned pickle jars for each group of students or individuals
- Plastic wrap
- Rubber bands for each jar
- Water
- Sand or pebbles to line the bottom of the jar
- Plastic cup

Have students place a layer of sand or pebbles at the bottom of each jar. Plant small plant in the jar and bury plastic cup

in soil to simulate a pond or lake and add enough water to fill the cup. Put plastic wrap over the entire mouth of the jar and secure with a rubber band. Place the jar in a warm, sunny spot.

The students will see droplets of water on the bottom surface of the plastic wrap. Ask the students to explain in their science notebooks why this occurred. Ask students to illustrate their jars and write observations focusing on the three states of matter (liquid, gas and solid) and transferring the vocabulary to precipitation, condensation and evaporation.

Further investigation would be to add an ice cube on top of the plastic wrap to see if it causes any change. Ask students what the ice cube would represent in the atmosphere, and why it would cause condensation.

Resources:

- [Download the Water Cycle Worksheet](#) (PDF format)

Extension:

Using an aquarium, ask the students to design a more realistic ecosystem using moss, lichen and small plants to investigate if the water cycle can sustain life (i.e. terrarium).

Adapted from www.aquariumofpacific.org

Additional Resources:

- [Water Cycle for Kid Topics and Activities from NeoK12.com](#)
- [Drinking Water Lessons, Games & Activities for Grades K-3 from EPA.gov](#)
- [More Background, Lessons & Activities from the Montana Science Partnership \(MSP\) at \[www.sciencepartners.info\]\(http://www.sciencepartners.info\)](#)

Related Crosscutting Concepts:

- [Patterns](#)
- [Cause & Effect](#)
- [Scale, Proportion & Quantity](#)
- [Systems & System Models](#)
- [Energy & Matter](#)
- [Stability & Change](#)

Related Disciplinary Core Ideas:

- [Core Idea PS1: Matter and Its Interactions](#)
 - [PS1.A: Structure and Properties of Matter](#)
- [Core Idea PS2: Motion and Stability: Forces and Interactions](#)
 - [PS2.A: Forces and Motion](#)
 - [PS2.B: Types of Interactions](#)
 - [PS2.C: Stability and Instability in Physical Systems](#)
- [Core Idea LS2: Ecosystems: Interactions, Energy, and Dynamics](#)
 - [LS2.A: Interdependent Relationships in Ecosystems](#)
 - [LS2.B: Cycles of Matter and Energy Transfer in Ecosystems](#)
 - [LS2.C: Ecosystem Dynamics, Functioning, and Resilience](#)