

**Project FOCUS
Best Lessons
FOURTH GRADE**

Title of Lesson: What is the Water Cycle?

Theme: Earth/Space Science

Unit Number: 2 **Unit Title:** Weather

Performance Standard(s) Covered (enter codes):

S4E3. Students will differentiate between the states of water and how they relate to the water cycle and weather.

S4E4. Students will analyze weather charts/maps and collect weather data to predict weather events and infer patterns and seasonal changes.

S4CS3

S\$CS1

Enduring Standards (objectives of activity):

Habits of Mind

- Asks questions
- Uses numbers to quantify
- Works in a group
- Uses tools to measure and view
- Looks at how parts of things are needed
- Describes and compares using physical attributes
- Observes using senses
- Draws and describes observations

Content (key terms and topics covered):

3 states of water

Boiling Point

Melting Point

Condensation [and Precipitation]

Evaporation

Melting

Learning Activity (Description in Steps)

Abstract (limit 100 characters): Students will observe the 3 states of water and how they relate to the water cycle and weather.

Details:

1. Have a hot plate set up with a flask and a beaker both filled with water. The flask should have a balloon attached to its end, and the beaker should just be left open. Also have a beaker of ice on the side, its okay if there is some melting water in the ice. While doing the discussion let the hot plate boil the water and expand the balloon. Begin by telling kids to be aware of hot plate and to put on goggles. Start discussing what the three states of matter are and what they look or feel like.

Emphasize the fact that solids keep their shape and volume, liquids vary their shape according to the container but have a definite volume [and can't be compressed], and gases don't have a fixed shape or volume.

2. Ask what the states of water are called: ice, water, and water vapor or steam
3. Discuss what causes the different changes in the states of matter: adding or removing heat
4. Define evaporation and condensation [touch upon melting too] and how these processes drive the water cycle [they should already have seen a video clip or read about the cycle in an earlier lesson, but refresh their memory]
5. Ask them and show what is happening to the flasks of water on the hot plate [one with a balloon attached to the top to show that the gas is still there even if it's not seen and the other is the open beaker that just has steam to compare to the balloon flask].
6. Ask and show what the thermometer will do when placed in the beaker. Be sure to discuss boiling points.
7. Show a beaker of ice and ask/demonstrate what will happen when the beaker is warmed [and have some melting from sitting aside away from the hot plate if possible]. Also show and ask what will happen if the thermometer is added to the ice. Be sure to discuss melting points. Also let them touch and feel the condensation on the side of the ice beaker.
8. After the observations on boiling and melting discuss how the evaporation and condensation seen are similar to the evaporation of ocean water by the sun and the cooling of the evaporated water vapor from the oceans to form clouds.

Materials Needed (Type and Quantity):

Hot plate

2 Beakers and 1 Flask

1 Balloon

2 Thermometers: so you can show multiple times the effects of raising and cooling temperatures

Water

Ice

Oven Mitt or Cloth to handle hot beakers

Safety Goggles for kids

Notes and Tips (suggested changes, alternative methods, cautions):

Keep the groups small so that all the students can see the thermometer rise and fall when placed in the ice water and boiling water. The smaller groups also keep the students more focused on the experiment rather than goofing off. Try to keep friends apart so they don't talk while the experiment is occurring, and keep enemies apart too since they tend to argue.

Sources/References:

- 1) Their Science Textbook
- 2) Collaboration with Connor Blackwell
- 3)