Lesson 4
How Does Water Vapor Change Into Liquid Water?

Key Idea

Water becomes an invisible gas and returns to a liquid.

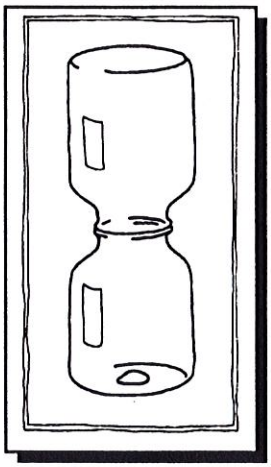
Activity

Students will examine how water vapor changes into liquid with a focus on evaporation, cooling and condensation.

Materials

Two glass tumblers or clear jars
Small amount of colored water
Eye dropper
Sticky tape
Bowl containing about an inch of ice water

Procedure



1 Ask: How can we make water go away and come back? To demonstrate for the class, put one drop of colored water (for visibility) in the bottom of a glass. Tape the other glass on top, closing the gap carefully. Set the glasses in a warm place (e.g., a sunny window sill or near a radiator). Ask questions such as:

- What do you think will happen to the water in the jar?
- If it disappears, where could it have gone? (into the air in the jar, as water vapor)
- How do you think we might get the drop out of hiding (in the air)?

2 When the drop has evaporated (disappeared), discuss the children's suggestions for bringing it back.

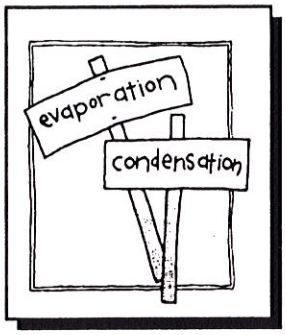
3 When cooling is suggested, set the glass in the bowl of ice water. Since our water drop likes to hide, we may have to wait 10 to 15 minutes. While waiting, ask:

- What made our drop of water jump into hiding? (warm air)

Procedure
(cont.)

- When liquid water turns into water vapor, what word do we use? (evaporation)

- Recall use of the term in Lesson 3. What are we using now to make the water drop come back? (cooling)



- What does cooling do to water vapor? (It makes the tiny particles or molecules condense or get closer together.)

4 Introduce the word condensation by writing it on the board. Then say it together and clap out the syllables. Repeat the illustration (Lesson 3) of condensation-evaporation by asking a child to exhale on the blackboard or window. Outline the dark spot made by moisture from the breath. Ask children to breathe out.

- Why doesn't this moisture show now? (The water droplets jump away into the air around you.)

- What made them show on the blackboard as a dark spot? Ask a child or two to touch the blackboard, then have them hold their hands in front of their mouths. Which is cooler? (the blackboard)

- What did we do to our glass to bring back the water drop? (We cooled it with ice water.)

5 Explain that cooling invisible water vapor slows the molecules and brings them back in a more condensed form as liquid water (condensation). Heating liquid water speeds up the molecules, spreading them further apart and making them invisible again (evaporation).

Extension

Students will study evaporation and condensation through drama.

Have the students ask each other to guess which they're acting out (e.g., fanning something - evaporation, or blowing on a window - condensation).

Extension
(cont.)

1 A piece of paper is needed for each child

Children fold the sheet in half. Label one half condensation, the other, evaporation. Let individuals or small groups plan and act out an activity to demonstrate one or the other. The other children hold up the correct word on their papers to show they recognize the process being shown.

Children may enjoy acting out liquid water molecules, walking about in a small group. Others may act out water vapor molecules, moving faster (e.g., running on the playground). Ask:

- How would you act out water molecules in snow or ice? (standing close together, moving slowly)

2 To continue your study of water molecules, contact the Arizona WET Director at the University of Arizona to obtain a copy of the National Project WET activity, *Molecules in Motion.*