

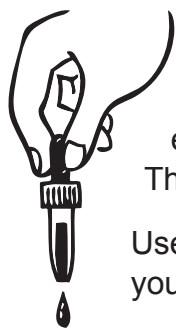
WATER, WATER, ALL AROUND

Evaporation is the changing of a liquid to a gas. *Condensation* is the change of a vapor into a liquid or solid. Both of these are components in the water cycle, also known as the hydrologic cycle. Water is always changing states in a continuous movement on, above, and below the surface of the Earth. It takes form as liquid, vapor, and ice, and the process of changing states can take place very quickly or over thousands of years.



Ocean saltwater makes up over 96% of Earth’s water, while freshwater makes up only a little over 2%. When the sun heats up water in the oceans or rivers or lakes, some of the water turns to vapor or steam (evaporates) and goes into the air. Some water vapor also goes into the air from plants when they lose water out of their leaves. This is called *transpiration*. What is it called when people lose water from their bodies (i.e. sweat)? Perspiration! Evaporation, transpiration, and perspiration are all acts that involve water changing to vapor and going into the air. (The salts and other, heavier materials are left behind.) You will be creating an atomizer in this unit, which is a device that will create a mist from a liquid. In essence, you will be conducting an experiment that is vaporizing the liquid, similar to condensation in the water cycle.

Once water vapor rises higher in the air, it cools down and changes back into liquid form, creating clouds. This is the act of condensation. You can witness this type of change at home, too. For example, if you pour cold water into a glass on a hot day, you’ll notice that water droplets start forming on the outside of the glass. It’s not water leaking out of the glass, it’s water vapor from the air. When it touches the cold glass, it changes back into a liquid. When you make your own cloud in the first activity, you will experience condensation first hand.



Diffusion is the movement or spreading out of molecules (or atoms) from an area of high concentration to low concentration. In the thermometer activity, you will watch how this happens in water and study its effects. You will also study how air pressure affects water and its temperature. There are many different components that affect the water cycle!

Use a computer or tablet to search for information on the Internet to help you as you complete the activities in this unit. Helpful search terms include:



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|--------------|-------------|-------------|
| condensation | water cycle | clouds |
| evaporation | temperature | thermometer |
| diffusion | atomizer | |

MAKE YOUR OWN CLOUD

GETTING STARTED

Weather is a critical element of life on Earth, and the behavior of water in its three states—solid, liquid, and gas—is a basic part of Earth’s many weather features.

Directions: Work in teams of two as you perform your first activity. Gather these materials as directed by your teacher.

TEAM MATERIALS

- baggies
- hot water
- jars or water glasses
- chalk dust
- ice
- flour
- jar tops or lids (or small plates)

1. Fill a glass jar or a water glass about $\frac{1}{3}$ full of hot water.
2. Sprinkle some chalk dust, flour, or both in the air above the hot water.
3. Cover the glass or jar with an upside-down lid or plate.
4. Place a baggie with ice cubes on top of the upside-down lid or plate.
5. Observe what occurs in the jar or glass.
6. Describe the cloud that forms. How much of the space in the jar does it fill?



7. What do you think happened to form the cloud?

8. What conditions in the atmosphere do you think are necessary to create clouds?

MAKE YOUR OWN CLOUD

9. What do you often see when you open a freezer door on a warm day?

10. What gradually happened to the cloud you created in the jar?

11. What forms on the lid or plate holding the ice? The term for these drops of water is *condensation*. Where else did the condensation form?

12. Place your bag of partially melted ice cubes in a warm place such as an outdoor table, on the blacktop, or on cement on a warm day. Watch how the condensation forms. Describe what happens. How long did it take?

13. How long did it take for the ice to become water? How long did it take for the water to become warm or to match the temperature of the outside air?

MAKE YOUR OWN CLOUD

JOURNAL ENTRY

Describe what you learned in the experiment. What natural events have you seen that involve condensation?

When have you felt some condensation on your body? What weather conditions cause some condensation?

What appliances cause condensation to form on your skin? How?

What appliances help remove condensation from your skin?

What natural events remove condensation from your skin?

DESIGN PROCESS REVIEW—MAKING YOUR OWN CLOUD

Share the experiment and your Journal Entry responses with your classmates in a class discussion led by your teacher.