

For Creative Minds

This For Creative Minds educational section contains activities to engage children in learning while making it fun at the same time. The activities build on the underlying subjects introduced in the story. While older children may be able to do these activities on their own, we encourage adults to work with the young children in their lives. Even if the adults have long forgotten or never learned this information, they can still work through the activities and be experts in their children's eyes! Exposure to these concepts at a young age helps to build a strong foundation for easier comprehension later in life. This section may be photocopied or printed from our website by the owner of this book for educational, non-commercial uses. Cross-curricular teaching activities for use at home or in the classroom, interactive quizzes, and more are available online. Go to www.ArbordalePublishing.com and click on the book's cover to explore all the links.

What are Clouds?

Clouds are collections of small water droplets or ice crystals floating in the atmosphere. They are made as part of the water cycle. There are three major stages to the water cycle:

1. **Evaporation:** When water gets hot enough, it turns into vapor (steam) and rises into the air. This occurs naturally when the sun heats the surface of a body of water. If you have ever seen a pot of water boiling on the stove, you've seen evaporation!
2. **Condensation:** When water vapor cools in the atmosphere, it changes from vapor into tiny droplets of water, or even ice crystals in very cold air. These water particles gather together and form clouds.
3. **Precipitation:** When so much water has gathered in a cloud that it is heavier than the air around it, the water falls back to the ground as precipitation. There are many different kinds of precipitation, including rain, hail, sleet, and snow.

Water Cycle Experiments

See evaporation in action

Materials: You will need a plastic cup, a marker, and water.

Process: Fill the cup halfway with water. Use the marker to indicate the top surface of the water. Leave the cup in the sunlight for several hours or for a whole day.

Observe: How has the water level in the cup changed?

Results: There is less water in the cup now than there was before. Some of the water in your cup evaporated.



See condensation in action

Materials: You will need a glass cup and ice.

Process: Fill the glass cup with ice and leave it on a table for at least twenty minutes.

Observe: When you come back, what do you notice on the outside of the glass or on the table underneath the cup?

Results: The water on the outside of the glass or under the cup did not leak through the cup—it came from the air! The ice in the glass caused the glass and the air nearby to cool. Water in the air changed from vapor to liquid, and clung to the surface of the cup or table. The cooler temperature created by the ice caused condensation.



See precipitation in action

Materials: You will need a ceramic mug, plastic wrap, a large bowl at least five to six inches deep, and a rubber band large enough to stretch around the bowl.

Process: Fill the bowl with 1-2 inches of water. Place the empty ceramic mug in the center of the bowl. Cover the bowl with plastic wrap and use the rubber band to hold the plastic wrap in place. Leave the bowl in the sunlight all day and let it sit overnight.

Observe: When you come back, what can you observe about the plastic wrap? Is it wet or dry? Is there anything inside the ceramic mug? Is the inside of the mug wet or dry?

Results: The entire water cycle has taken place within your bowl! First the heat from the sun caused evaporation from the water in the bowl. Next, the water vapor gathered at the top of the bowl, just under the plastic wrap. During this condensation, it formed small droplets that clung to the plastic surface. Finally, the droplets grew larger and heavier until they fell. This precipitation rained down into the ceramic mug and back into the water in the bowl.



Match the Clouds

There are four major categories of clouds: cirrus, cumulus, stratus, and nimbus. Use the following descriptions to identify the cloud types shown below. There are two of each of the following three kinds of cloud.

A. Wispy clouds with a white or light gray color are **cirrus** clouds.

B. **Cumulus** clouds look like a heap of puffy cotton balls.

C. **Stratus** clouds are flat and hazy. Stratus clouds sometimes cover much of the sky and can form as low-lying, misty fog.

Bonus: A **nimbus** cloud is any cloud that produces precipitation. They are usually dark gray and can be combined with other kinds of clouds. A cumulus cloud that produces precipitation is called a cumulonimbus. Can you identify the cumulonimbus on this page?

1.



2.



3.



4.



5.



6.



Answers. Cirrus: 1 and 6. Cumulus: 3 and 4. Stratus: 2 and 5.
Bonus. Cumulonimbus: 4

Weather Predictions

Clouds can be used to predict the weather.



A few **cirrus** clouds are a sign of clear weather, but a large group of cirrus clouds indicates that the weather will change within 24-36 hours.

When **cumulus** clouds are white, puffy, and spread out in a single horizontal layer, they are a sign of fair weather. When they pile up into vertical stacks and turn gray, cumulus clouds turn into cumulonimbus clouds. Cumulonimbus clouds can bring short bursts of heavy precipitation, lightning storms, high winds, or tornados.



Stratus clouds often gather in thick blankets that cover much of the sky. When they form overnight, they generally disappear in the morning, leaving clear weather for the rest of the day. Precipitation from nimbostratus clouds is generally light rain, mist or snow flurries, but can last for several days.



Any cloud that produces precipitation is a nimbus cloud. Nimbus clouds are dark gray and a clear sign that precipitation is coming. A stratus cloud that produces precipitation, like this misty fog, is a nimbostratus.

