

# What are clouds?

By NASA, adapted by Newsela staff on 01.27.17

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This image, a photograph taken from an F-15C, shows a much closer view of a developing pyrocumulus cloud, or fire cloud, a dense cumuliform cloud associated with fire or volcanic eruptions, that may produce dry lightning (lightning without rain). This photo was taken above the Oregon Gulch fire from an Oregon Air National Guard F-15C by James Haseltine on July 31, 2014. Photo courtesy of the U.S. Air National Guard.

A cloud is a mass of water drops or ice crystals suspended in the atmosphere. Clouds form when water vapor changes from a gas to a liquid in the sky. This is called condensation. Condensation lets us see the water vapor. There are many different types of clouds. Clouds are an important part of Earth's weather and climate.

## How Do Clouds Form?

Clouds form from water in the sky. The water may evaporate from the ground or move from other areas. Water vapor is always in the sky in some amount, but is invisible. Clouds form when an area of air becomes cooler until the water vapor there changes from a gas to a liquid. At that point, the air is said to be "saturated" with water vapor. In other words, it is full of water vapor. The water will condense around particles like dust, ice or sea salt — all known as condensation nuclei. When the water sticks to these particles we can see the cloud. The temperature, wind and other conditions where a cloud forms determine what type of cloud it will be.

## What Are Some Types Of Clouds?

Clouds are categorized primarily by location and shape. High clouds form several kilometers up in the sky, with the exact height depending on the temperatures where they form. Low clouds generally form within a kilometer or two of Earth's surface. In fact, low clouds can even form touching the ground, when they are called fog. Middle-level clouds form between low and high clouds.

Cirrus clouds are thin and wispy and often curve with the wind. Cumulus clouds tend to be big and fluffy. These clouds look kind of like giant cotton balls or other shapes in the sky. As a middle-level cloud, this type also can form parallel stripes of clouds. Stratus clouds form sheets of clouds that cover the sky.

## What Causes Rain?

Most of the water in clouds is in very small droplets, but sometimes those droplets collect more water. Then they turn into larger drops. When that happens, gravity causes them to fall through the air faster. The falling water drops are rain. When it is colder, the water may form snowflakes instead. Clouds also can cause freezing rain or sleet. These happen when snow melts on the way to the ground but then gets colder again. Hail falls during more severe weather. Air currents cause rain and snow to move around in the sky. As they move, they get colder and turn into ice. As they move, the ice chunks get bigger. Finally, they fall to the ground as hail.

## Why Study Clouds?

Clouds are important for many reasons. Precipitation, like rain or snow, is one of those reasons. At night, clouds reflect heat back to the Earth's surface and keep it warmer. During the day, clouds can shade us from the sun and keep Earth cooler. Studying clouds helps scientists better understand Earth's weather and climate. NASA uses satellites in space as well as computers to study clouds.

NASA also studies clouds on other planets. Mars has clouds that are similar to some clouds on Earth. Other planets have clouds made of materials other than water. For example, Saturn's moon Titan has clouds of methane and ethane gas. Jupiter has clouds made of ammonia gas.