

Quick Lab

15 min

Cloud Formation



Procedure

- 1 Use a bottle opener to puncture one or two holes into the metal lid of a glass jar.
- 2 Pour 1 mL of hot water into the jar, then secure the lid on the jar.
- 3 Place an ice cube over the holes in the lid of the jar. Make sure that the holes are completely covered.
- 4 Observe the changes that occur within the jar.

Analysis

1. Draw a diagram of the jar. Label the areas of the diagram where evaporation and condensation take place. Also, label areas where latent heat is released and absorbed.
2. Explain why latent heat was released and absorbed in the areas that you labeled on your diagram.

stratus cloud a gray cloud that has a flat, uniform base and that commonly forms at very low altitudes

Figure 4 A variety of cloud types can be identified by their altitude and shape. *What cloud types form at or above 6,000 m?*

Classification of Clouds

Clouds are classified by their shape and their altitude. The three basic cloud types are stratus clouds, cumulus clouds, and cirrus clouds. There are also three altitude groups: low clouds (0 to 2,000 m), middle clouds (2,000 to 6,000 m), and high clouds (above 6,000 m). This classification system is shown in **Figure 4**.

Stratus Clouds

Clouds that have a flat, uniform base and that begin to form at very low altitudes are called **stratus clouds**. *Stratus* means “sheet-like” or “layered.” The base of stratus clouds is low and may almost touch Earth’s surface. Stratus clouds form where a layer of warm, moist air lies above a layer of cool air. When the overlying warm air cools below its dew point, wide clouds appear. Stratus clouds cover large areas of sky and often block out the sun. Usually, very little precipitation falls from most types of stratus clouds.

Two variations of stratus clouds are known as *nimbostratus* and *altostratus*. The prefix *nimbo-* and the suffix *-nimbus* mean “rain.” Unlike other stratus clouds, the dark nimbostratus clouds can cause heavy precipitation. Altostratus clouds form at the middle altitudes and usually produce very little precipitation.

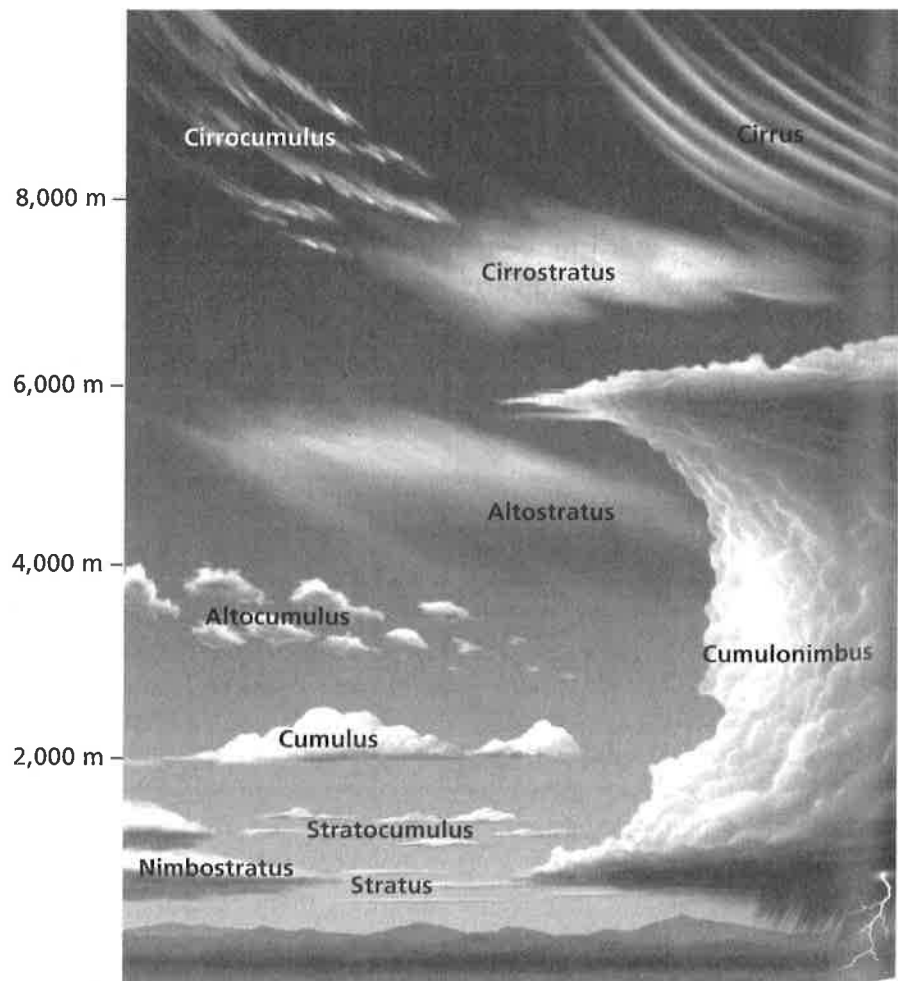




Figure 5 Cumulus clouds (left) are puffy, vertically growing clouds, while cirrus clouds (right) are wispy.

Cumulus Clouds

Low-altitude, billowy clouds that commonly have a top that resembles cotton balls and a dark bottom are called **cumulus clouds**. *Cumulus* means “piled” or “heaped.” Cumulus clouds usually look fluffy, as shown in **Figure 5**. These clouds form when warm, moist air rises and cools. As the cooling air reaches its dew point, the clouds form. The flat base that is characteristic of most cumulus clouds represents the condensation level.

The height of a cumulus cloud depends on the stability of the troposphere, which is the layer of the atmosphere that touches Earth’s surface, and on the amount of moisture in the air. On hot, humid days, cumulus clouds reach their greatest heights. High, dark storm clouds known as *cumulonimbus clouds*, or thunderheads, are often accompanied by rain, lightning, and thunder. If the base of cumulus clouds begins at middle altitudes, the clouds are called *altocumulus clouds*. Low clouds that are a combination of stratus and cumulus clouds are called *stratocumulus clouds*.

Cirrus Clouds

Feathery clouds that are composed of ice crystals and that have the highest altitude of any cloud in the sky are **cirrus clouds**. Cirrus clouds are also shown in **Figure 5**. *Cirro-* and *cirrus* mean “curly.” Cirrus clouds form at altitudes above 6,000 m. These clouds are made of ice crystals because the temperatures are low at such high altitudes. Because these clouds are thin, light can easily pass through them.

Cirrocumulus clouds are high-altitude, billowy clouds composed entirely of ice crystals. Cirrocumulus clouds commonly appear just before a snowfall or a rainfall. Long, thin clouds called *cirrostratus clouds* form a high, transparent veil across the sky. A halo may appear around the sun or moon when either is viewed through a cirrostratus cloud. This halo effect is caused by the bending of light rays as they pass through the ice crystals.

Reading Check Why are cirrus clouds commonly composed of ice crystals?

cumulus cloud a low-level, billowy cloud that commonly has a top that resembles cotton balls and a dark bottom

cirrus cloud a feathery cloud that is composed of ice crystals and that has the highest altitude of any cloud in the sky

READING TOOLBOX

Analyzing Comparisons

As you read about cumulus clouds and cirrus clouds, look for comparisons between them. Create a table of their similarities and differences.