



Overview:

Various features define the three main types of clouds: cumulus, cirrus, and stratus. One of those features is height. In this activity, students will learn to identify clouds based on their height in the sky and create a mobile representing those clouds.

Objectives:

The student will:

- understand the three basic cloud types;
- learn how to identify the three basic cloud types based on height; and
- create a mobile.

GLEs Addressed:

Science

- [3-4] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.
- [3] SD1.2 The student demonstrates an understanding of geochemical cycles by describing the water cycle to show that water circulates through the crust, oceans, and atmosphere of Earth.

Whole Picture:

Clouds are formed when water on Earth evaporates and forms water vapor held in the air. As warm air rises, cooling occurs. The cooler the air, the smaller the amount of water vapor it can hold, therefore some of the water vapor is forced to condense onto tiny particles (dust, pollution) floating in the atmosphere. A small drop of water forms around each particle. A cloud is a visible *mass* of such water in the form of small droplets or ice crystals that are small enough to stay suspended in the atmosphere.

Clouds can be categorized into three *basic* types: cirrus, cumulus and stratus.

Cirrus clouds are characterized by thin, wispy strands that appear high in the sky, generally between 20,000 and 40,000 feet (6 to 12 kilometers), but may be even higher. This is the equivalent of several miles, as one mile equals 5,280 ft. Here the water droplets freeze and form ice crystals. High winds blow the clouds into long streamers thin enough for sunlight and moonlight to pass through. Airplanes traveling at such heights leave condensation trails that can turn into cirrus clouds. A thickening, or abundance, of cirrus clouds can be an indication of an approaching frontal system. In Latin cirrus means “curl of hair.”

Cumulus clouds are characterized by puffy, billowing towers of white that can extend for thousands of feet, usually beginning with flat bases ranging from 4,000 to 8,000 feet (1.2 to 2.5 kilometers) in altitude. Such clouds are formed when warm, moist air rises. As it rises, the air cools and condensation occurs. The size of a cumulus cloud depends on the force of the upward movement of the air and the amount of moisture in the air.

The presence of cumulus clouds indicates fair weather; however, when such clouds continue to grow larger and taller, forming cumulonimbus clouds, they can produce heavy rain, lightning, winds, hail, and even tornadoes. In Latin, cumulus means “heap.”

Stratus clouds are characterized by their uniform look, blanketing the sky with white and grey. Such clouds are often formed when a layer of warm, moist air passes over a layer of cool air. As the two layers meet, the warm air cools to the point of condensation, forming a blanket-like cloud. These flat, featureless clouds are low in altitude (usually 2,000 to 7,000 feet or 2 to .5 kilometers) and obscure the sun.

Stratus clouds can reach the ground. When this happens these clouds are called fog. Above-ground, stratus clouds may bring light mist, drizzle, or light snow. In Latin, stratus means “layer.”

Terms such as altostratus, stratocumulus and cirrostratus help further define cloud types based on a combination of structure and height. The term “nimbus” is added as a prefix or suffix to indicate the presence of precipitation. A nimbostratus cloud is a stratus cloud that is producing rain or snow. A cumulonimbus cloud is a cumulus cloud producing stormy, wet weather.

Clouds appear white because the water droplets and ice crystals reflect sunlight. Light is composed of a spectrum of colors that, when added together, appear white to the human eye. Clouds appear gray when the droplets begin to crowd together so that the sunlight cannot pass through. This can also be an indication the cloud is becoming oversaturated and will produce rain, snow, or hail.

Materials:

- Straws (2 per student)
- String
- Glue
- Cotton balls
- Quilt batting
- Tape
- Scissors
- OVERHEAD: “Clouds”
- STUDENT INSTRUCTION SHEET: “Cloud Mobile”

Activity Preparation:

For Level I students, cut quilt batting into strips and string into lengths.

Activity Procedure:

1. Remind students clouds hold water in the atmosphere, or sky above Earth. When clouds release water, it falls to Earth as rain or snow.
2. There are three different types of clouds: cumulus, cirrus, and stratus.
3. Cirrus clouds are thin and wispy and are made of ice crystals. They are found as high as ten miles above Earth.
4. Cumulus clouds are fluffy white clouds. They grow upwards and increase in number and size during afternoon warmth. They are found lower in the atmosphere than cirrus clouds.
5. Stratus clouds are thin, layered clouds that form close to the ground. Fog is a stratus cloud.
6. Distribute the STUDENT INSTRUCTION SHEET: “Cloud Mobile” and necessary materials. Help students make their clouds, cut them out, and assemble their mobile.
7. Keep student mobiles for the “Light Refraction” lesson.

Language Links:

Alaska Native people have always been careful observers of the weather. Their languages are rich in words describing weather. Ask a local Native language speaker to provide the words in the local dialect for the weather phenomenon listed in the chart below. The local dialect for these words may differ from the examples provided. Share the words with students to build fluency in local terms related to weather. Include local words in songs, stories and games when possible.

| English | Yupik | Inupiaq | Local Dialect |
|---------|----------|---------|---------------|
| cloud | qilawaaq | nuviya | |

Answers:

There are no questions on the student worksheets for this lesson.

Cloud Mobile

Student Instruction Sheet (page 1 of 3)

Level



You will need:



glue



scissors



cotton balls



cotton strips



2 straws



string



tape

Make a Cloud Mobile:

Make a cirrus cloud by pulling pieces of cotton into thin wisps and then gluing them into the box below.



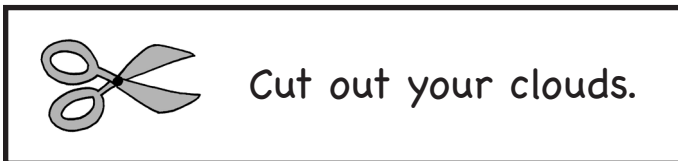
Cloud Mobile

Student Instruction Sheet (page 2 of 3)

Make a cumulus cloud by gluing cotton balls in the shape of a cloud in the box below.



Make a stratus cloud by cutting strips of quilt batting and gluing strips into the box below.



Cloud Mobile

Level I Student Instruction Sheet (page 3 of 3)



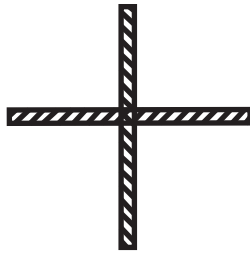
Tape the longest string to the back of the stratus cloud.

Tape the next longest string to the back of the cumulus cloud.

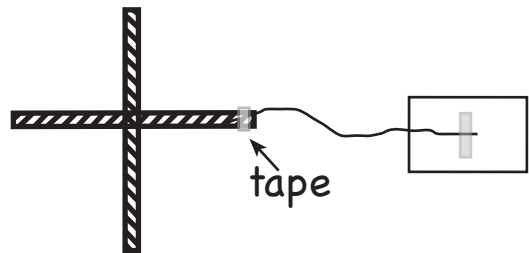
Tape the shortest string to the back of the cirrus cloud.



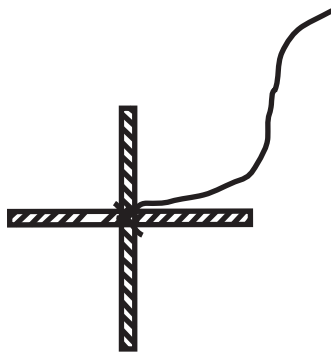
Tape your two straws together to form a +.



Attach the clouds to the ends of the straws with tape.



Tie the last string around the two straws where they cross in the center. This will be used to hang the mobile.



Cloud Mobile

Student Instruction Sheet (page 1 of 3)

Level



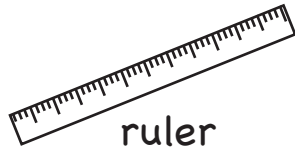
You will need:



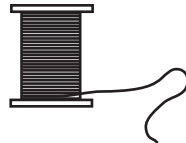
glue



scissors



ruler



string



2 straws



cotton balls



quilt batting



tape

Make a Cloud Mobile:

Make a cirrus cloud by pulling pieces of cotton into thin wisps and then gluing them into the box below. Cut along dashed lines.



Cloud Mobile

Student Instruction Sheet (page 2 of 3)

Make a cumulus cloud by gluing cotton balls in the shape of a cloud in the box below. Cut along dashed lines.

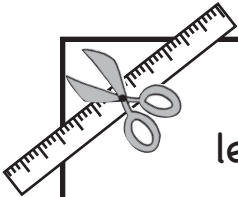


Make a stratus cloud by cutting strips of quilt batting and gluing the strips into the box below. Cut along dashed lines.



Cloud Mobile

Level II Student Instruction Sheet (page 3 of 3)



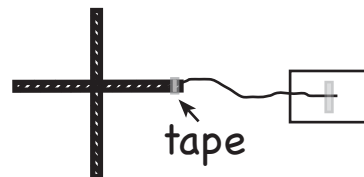
Measure and cut three pieces of string to the following lengths: 6 inches, 8 inches, and 10 inches.

- Tape the 6-inch string to the back of the cirrus cloud.
- Tape the 8-inch string to the back of the cumulus cloud.
- Tape the 10-inch string to the back of the stratus cloud.

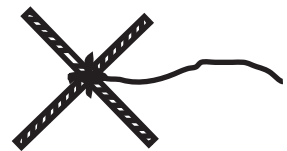
Tape the two straws together to form a cross.



Tape the loose end of each string to the straw ends. Leave one straw end empty.

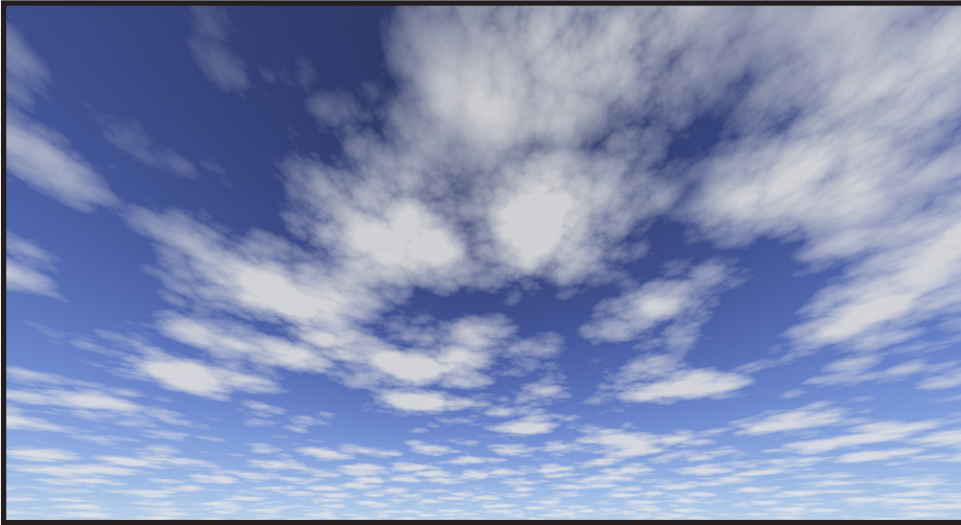


Cut another small piece of string about 4-inches long. Tie it around the straws where they cross to form a loop. This string will be used to hang the mobile.



Clouds

Overhead



Cirrus clouds

Cirrus clouds occur high up in the sky.

These thin, wispy clouds are often stretched out by high winds.



Cumulus clouds

Cumulus clouds are white, puffy clouds that look like floating cotton balls.

When they grow larger and taller, they can develop into thunderstorm clouds.



Stratus clouds

Stratus clouds are thick gray clouds that occur lower and often cover the entire sky.

Light rain or drizzle often falls from these clouds.