



CLOUDS FORMATION

What are clouds?

A cloud is a large collection of very tiny droplets of water or ice crystals. The droplets are so small and light that they can float in the air.

How are clouds formed?

All air contains water, but near the ground it is usually in the form of an invisible gas called water vapour. When warm air rises, it expands and cools. Cool air can't hold as much water vapour as warm air, so some of the vapour condenses onto tiny pieces of dust that are floating in the air and forms a tiny droplet around each dust particle. When billions of these droplets come together they become a visible cloud.

Why are clouds white?

Since light travels as waves of different lengths, each colour has its very own unique wavelength. Clouds are white because their water droplets or ice crystals are large enough to scatter the light of the seven wavelengths (red, orange, yellow, green, blue, indigo, and violet), which combine to produce white light.

Why do clouds turn grey?

Clouds are made up of tiny water droplets or ice crystals, usually a mixture of both. The water and ice scatter all light, making clouds appear white. If the clouds get thick enough or high enough all the light above does not make it through, hence the gray or dark look. Also, if there are lots of other clouds around, their shadow can add to the gray or multicoloured grey appearance.

Why do clouds float?

A cloud is made up of liquid water droplets. A cloud forms when air is heated by the sun. As it rises, it slowly cools it reaches the saturation point and water condenses, forming a cloud. As long as the cloud and the air that it's made of is warmer than the outside air around it, it floats!

How do clouds move?

Clouds move with the wind. High cirrus clouds are pushed along by the jet stream, sometimes travelling at more than 100 miles-per-hour. When clouds are part of a thunderstorm they usually travel at 30 to 40 mph.

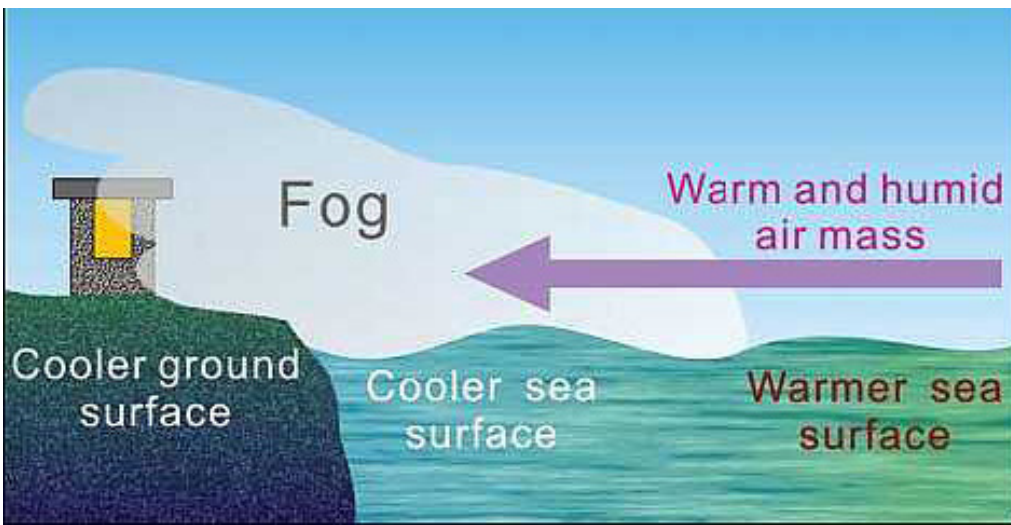


Why do clouds form at different heights in the atmosphere?

The characteristics of clouds are dictated by the elements available, including the amount of water vapour, the temperatures at that height, the wind, and the interplay of other air masses.

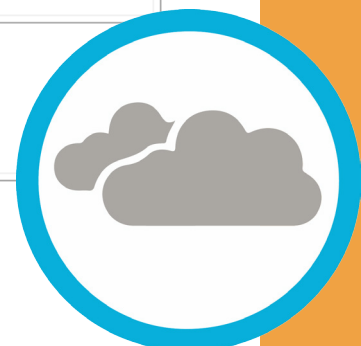
How is fog formed?

There are many different types of fog, but fog is mostly formed when southerly winds bring warm, moist air into a region, possibly ending a cold outbreak. As the warm, moist air flows over much colder soil or snow, dense fog often forms. Warm, moist air is cooled from below as it flows over a colder surface. If the air is near saturation, moisture will condense out of the cooled air and form fog. With light winds, the fog near the ground can become thick and reduce visibilities to zero.



CLOUD CHART

Cloud Group	Cloud Height	Cloud Types
High Clouds = Cirrus	Above 18,000 feet	Cirrus Cirrostratus Cirrocumulus
Middle Clouds = Alto	6,500 feet to 18,000 feet	Altostratus Alto cumulus
Low Clouds = Stratus	Up to 6,500 feet	Stratus Stratocumulus Nimbostratus
Clouds with Vertical Growth		Cumulus Cumulonimbus
Special Clouds		Mammatus Lenticular Fog Contrails



CIRRUS CLOUDS

Cirrus clouds are the most common of the high clouds. They are composed of ice and are thin, wispy clouds blown in high winds into long streamers. Cirrus clouds are usually white and predict fair to pleasant weather. By watching the movement of cirrus clouds you can tell from which direction weather is approaching. When you see cirrus clouds, it usually indicates that a change in the weather will occur within 24 hours.



Cirrostratus clouds are thin, sheetlike high clouds that often cover the entire sky. They are so thin that the sun and moon can be seen through them. Cirrostratus clouds usually come 12-24 hours before a rain or snow storm.



Cirrocumulus clouds appear as small, rounded white puffs that appear in long rows. The small ripples in the cirrocumulus clouds sometime resemble the scales of a fish. Cirrocumulus clouds are usually seen in the winter and indicate fair, but cold weather. In tropical regions, they may indicate an approaching hurricane.



'ALTO' CLOUDS

Altostratus clouds are gray or blue-gray mid level clouds composed of ice crystals and water droplets. The clouds usually cover the entire sky. In the thinner areas of the clouds, the sun may be dimly visible as a round disk. Altostratus clouds often form ahead of storms with continuous rain or snow.



Alto cumulus clouds are mid level clouds that are made of water droplets and appear as gray puffy masses. They usually form in groups. If you see alto cumulus clouds on a warm, sticky morning, be prepared to see thunderstorms late in the afternoon.



STRATUS CLOUDS

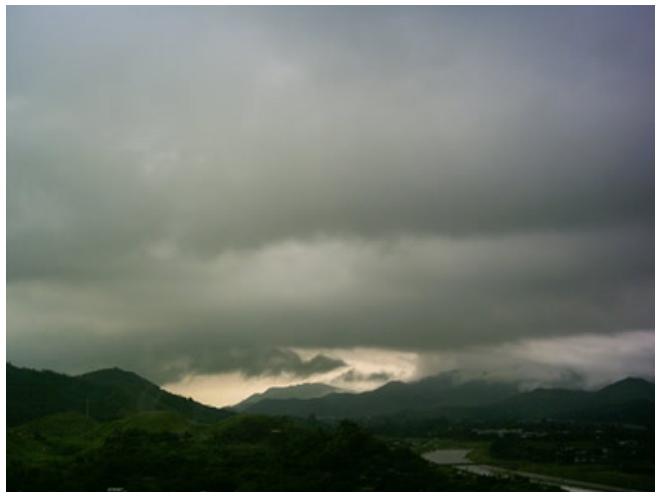
Stratus clouds are uniform greyish clouds that often cover the entire sky. They resemble fog that doesn't reach the ground. Light mist or drizzle sometimes falls out of these clouds.



Stratocumulus clouds are low, puffy and gray. Most form in rows with blue sky visible in between them. Rain rarely occurs with stratocumulus clouds, however, they can turn into nimbostratus clouds.



Nimbostratus clouds form a dark gray, wet looking cloudy layer associated with continuously falling rain or snow. They often produce precipitation that is usually light to moderate.



Cumulus clouds are white, puffy clouds that look like pieces of floating cotton. Cumulus clouds are often called “fair-weather clouds”. The base of each cloud is flat and the top of each cloud has rounded towers. When the top of the cumulus clouds resemble the head of a cauliflower, it is called cumulus congestus or towering cumulus. These clouds grow upward and they can develop into giant cumulonimbus clouds, which are thunderstorm clouds.



Cumulonimbus clouds are thunderstorm clouds. High winds can flatten the top of the cloud into an anvil-like shape. Cumulonimbus clouds are associated with heavy rain, snow, hail, lightning and even tornadoes. The anvil usually points in the direction the storm is moving.



SPECIAL CLOUDS

Mammatus clouds are low hanging bulges that droop from cumulonimbus clouds. Mammatus clouds are usually associated with severe weather.



Lenticular clouds are caused by a wave wind pattern created by the mountains. They look like discs or flying saucers that form near mountains.



Fog is a cloud on the ground. It is composed of billions of tiny water droplets floating in the air. Fog exists if the atmospheric visibility near the Earth's surface is reduced to 1 kilometre or less.



Contrails are condensation trails left behind jet aircrafts. Contrails form when hot humid air from jet exhaust mixes with environmental air of low vapour pressure and low temperature. The mixing is a result of turbulence generated by the engine exhaust.



Fractus clouds are small, ragged cloud fragments that are usually found under an ambient cloud base. They form or have broken off from a larger cloud, and are generally sheared by strong winds, giving them a jagged, shredded appearance. Fractus have irregular patterns, appearing much like torn pieces of cotton candy. They change constantly, often forming and dissipating rapidly. They do not have clearly defined bases. Sometimes they are persistent and form very near the surface.



Green Clouds are often associated with severe weather. The green colour is not completely understood, but it is thought to have something to do with having a high amount of liquid water drops and hail inside the clouds. In the Great Plains region of the U.S. green clouds are associated with storms likely to produce hail and tornadoes.



Suggestions:

- This session can be delivered at Headquarters by using a power point presentation (available in Resources Folder under the title "Clouds Formation – Gold Arrow") or charts, etc.



ACTIVITY FACT SHEET



Activity: Indoor session



Objective: Cloud Formations



Time: 2 hours



Outline: This activity can be delivered at headquarters by using an interesting power point presentation (found in the Resources Folder) to explain the various cloud formations. The cubs can be involved by doing an activity where they can be asked to differentiate between the different cloud formations – using pictures/charts.



Equipment: Laptop & projector (for ppt); charts.



Place: Headquarters/any outdoor activity



Group Size: Pack









3rd Parties: N/A



ACTIVITY FACT SHEET



During the Activity:

-  – The cubs will need to discuss and share experiences to distinguish the different cloud formations.
-  – Going out for a hike or doing an outdoor activity to observe the cloud formations.
-  – The cubs have to understand the cloud formations and how they are formed and what weather they bring about.
-  – When the cubs are asked to distinguish the different cloud formations, the creative aspect comes in. In addition when outdoors, you can ask the cubs to look at the clouds and imagine what shapes they form.
-  – A small game: The leaders calls out different types of weather that different types of clouds bring about (e.g. rainy, thunder, sunny) and the cubs need to divide in two, those who like that type of weather and those who do not like it. After each type of weather discuss with them why they like it/do not like it and how that type of weather makes them feel. For example: Rain – cosy, Thunder – afraid, Sunny – happy. You can also invite them to share memories of some things that happened to them in relation to the particular weather.
-  – Help the cubs appreciate the beauty of nature and they way it works to recreate itself (sunny, condensation, clouds, rain, grass, flowers, water, sun, etc).

GOLD ARROW

After the Activity:

The cubs can be asked to observe cloud formations during a particular period (over a week) and then discuss them with their leader. In addition, when an outdoor activity is organized, like a hike, the attention of the cubs can be drawn to the different cloud formations seen on the day.

