

Clouds in layers

Layer clouds spread out evenly across the sky. Most layer clouds indicate changeable weather, and some are connected with long periods of rain.

Q1. What is the name for the lowest kind of layer cloud?

✎ S.....

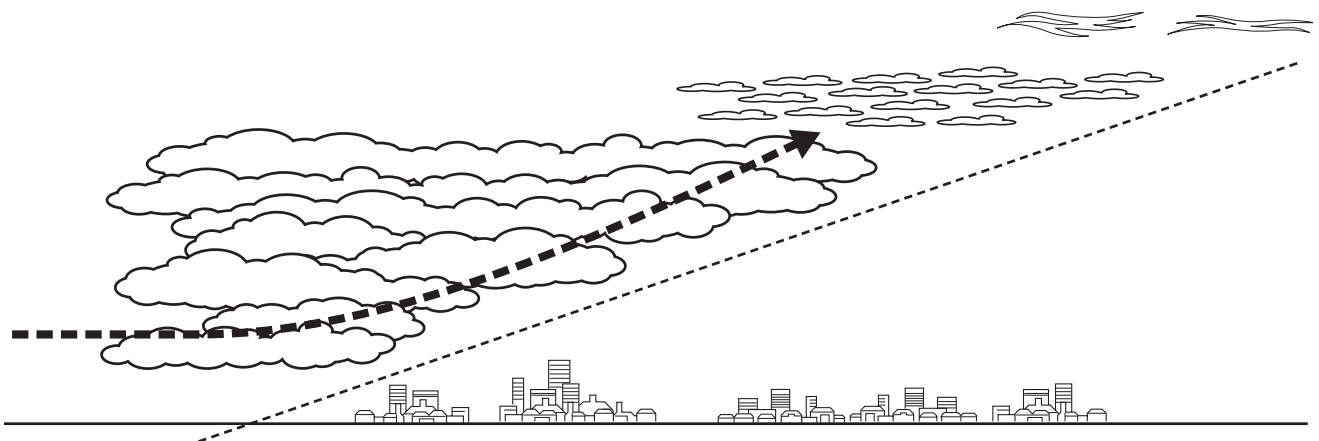
Q2. Which layer clouds are made of ice crystals?

✎ C.....

Q3. Which two types of layer cloud never produce rain?

✎ C..... and A.....

Q4. Match the words cirrus, altostratus and stratus, to their correct places on the diagram below.



Background

Layer clouds

Layer clouds are of two types: the thin wispy veils of ice crystals, called cirrus clouds, and the thicker cloud sheets of water droplets (and perhaps ice crystals), called altostratus (if they are thin and of medium height) or stratus (low) clouds. See the full descriptions on pages 38 to 40 of this teacher's resource book.

Layer clouds are rarely found in the hot tropics where towering cumulus dominate, but are mostly typical of mid- and high-latitudes. They provide the bulk of the clouds that form around depressions, and they are also commonly found where flows of air are forced up over hills, mountains or coastal cliffs.

Stratus clouds and rain

It is useful if students are introduced to the idea that cloud thickness determines the likelihood of rain. In part, this can be shown by colour. The thicker the cloud, the darker the base because less light can get through. Thin, white clouds can therefore, never produce rain.

Some thick clouds do not appear to produce rain either. In fact, they most likely do, but the air between the cloud base and the ground is probably so dry that the raindrops evaporate before they reach the ground. Sometimes you can actually see this as grey wisps of rain falling from the cloud base.

How raindrops form in layer clouds

In the mid-latitudes, only summer thunderstorms have the fierce thermals that drag droplets together to make large raindrops. In most layer clouds, the currents of rising air are much weaker, and a different rain-making process is at work.

By making some of the world's first high-level aircraft flights in the 1920s, the Norwegian scientist Bergeron discovered how rain, sleet and snow all form from a single process.

During his flights he found that water droplets get lifted up into the upper regions of a cloud where ice crystals occur. In this zone, the water droplets help provide the moisture needed to make ice crystals grow big enough to form large snowflakes, which then fall from the cloud. If the air below the cloud is warm, the snowflakes melt and the cloud produces droplets of rain. If the air is cold, the crystals do not melt and the clouds produce snow, or partly melted snow, called sleet.

The thickest of the layer clouds are the rain-bearing nimbostratus (*nimbo* simply means rain-bearing.) There are few swift thermals in these clouds, and thunder and lightning rarely occur.

Nimbostratus clouds occur when a great thickness of moist air is lifted bodily upwards. This can occur at a mountain front and also at a warm front of a depression.

In many cases you can see multi-level clouds. All this means is that the air was not moist throughout its depth when it was lifted. Those regions that were moist have produced cloud, whereas those regions where the air was less moist have remained clear.

Answers

- Q1. **Stratus**
- Q2. **Cirrus**
- Q3. **Cirrus and altostratus**
- Q4. **The clouds in descending order are:**

