

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## CLOUDS

Clouds are an important part of the water cycle. The water cycle is the movement of water from the Earth into the sky and then back down to Earth again. Did you know that over 70% of the Earth is covered in water? Water on Earth is in the form of salt water (97%), the water that is found in the oceans and saltwater lakes, and fresh water (3%), the water that is found in rivers, ponds, lakes, streams and underground. The sun heats water on the surface of the Earth, and causes it to *evaporate*. Evaporation is the process when water moves from being a liquid to being vapor. Water vapor is made up of tiny water droplets in the air. Water can also move into the air through *transpiration*. Transpiration is the movement of water out of plants. During photosynthesis, plants make oxygen and water. Water then moves out of tiny holes on the leaves and into the air. The water vapor rises up into the atmosphere, and as it cools, it *condenses*. When the water vapor condenses it forms clouds. *Precipitation* happens when so much water vapor condenses that the air cannot hold it anymore. The clouds get so heavy that some of the water must fall back down to Earth as rain, snow, sleet or hail.



There are many different types of clouds. The type of cloud depends on how high up in the atmosphere the water condenses. The atmosphere is the blanket of air that covers the Earth.

### **Stratus clouds**

Stratus clouds occur below 6,000 feet. These clouds look like flat sheets of clouds, and can mean an overcast or rainy day. These clouds are usually a uniform color of gray, and cover most of the sky.

### **Cumulus clouds**

Cumulus clouds are also below 6,000 feet, and look like big fluffy balls of cotton! They usually mean that the weather will be nice; however, sometimes they can get very tall and turn into thunderheads. These clouds are usually flat on the bottom, but have very lumpy tops. Cumulus clouds usually form alone, and there is a lot of blue sky between different clouds.

### **Cirrus clouds**

These wispy clouds usually form above 18,000 feet. Cirrus clouds generally move from west to east. They form when water vapor forms ice crystals, and they are so thin because of the height at which they form. There is very little water vapor above 18,000 feet, and so big thick clouds cannot form.

These are the three main types of clouds that can form; however, there are also several combination clouds.

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## Combination Clouds

*Stratocumulus clouds* usually form below 6,000 feet, and usually form in rows or patches, with blue sky in between. The color of stratocumulus clouds can be from white to dark gray, but precipitation hardly ever falls from these clouds.

*Nimbostratus clouds* also form below 6,000 feet, and usually produce a steady form of precipitation. Steady precipitation isn't like a hard thunder shower, but can instead last for several hours or even more than a day. Nimbostratus clouds are so thick that you can't see the sun or the moon through them.

*Altostratus clouds* form higher than stratocumulus or nimbostratus clouds. They form between 6,000 and 20,000 feet. Altostratus clouds cover the entire sky over a large area, and usually produce steady precipitation ahead of a storm. You can see a bit of the sun through the clouds, but the sun will be hazy or 'watery'. Even though you can see the sun, altostratus clouds do not let enough sunlight through to produce shadows.

*Altostratus clouds* also form between 6,000 and 20,000 feet. These clouds look like puffy gray balls or blobs, and sometimes appear in rows. Part of these clouds is usually darker than the rest, and this helps to set them apart from higher cirrocumulus clouds. If you see these clouds on a hot summer morning it often means that there will be thunderstorms in the afternoon.

*Cirrostratus clouds* form even higher than most altostratus and altostratus clouds, at above 18,000 feet. These clouds are so thin that you can see the moon and the sun clearly. Sometimes you only know that there are cirrostratus clouds in the sky because you can see a fuzzy halo around the sun or the moon. This halo is caused because the ice crystals in the cloud bend the light from the sun and the moon. Cirrostratus clouds usually mean that there will be rain or snow within 24 hours.

Other mixed clouds that form high in the sky are *cirrocumulus clouds*. They also form above 18,000 feet. They can look like small rounded puffs or cotton balls, either alone or in rows. When the puffs are in rows, the sky has a rippling look, and this is how you can tell that they are cirrocumulus clouds, and not cirrus or cirrostratus clouds.

Finally, there are the *cumulonimbus clouds*. These clouds are thunderstorm clouds. The word *nimbus* or *nimbo* means precipitation producing cloud. **Nimbostratus** clouds produce steady rain and cumulon**imbus** clouds produce thunderstorms.

Clouds can be fluffy and white, or heavy and gray. They can bring rain and snow, or day long drizzle. But whatever color or shape they come in, they still do the same thing. They return water to the Earth, and they are an important part of the water cycle.

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### Questions on **Clouds**

1. How much of the Earth is covered in water?  
\_\_\_\_\_
2. How is the water on Earth split up?  
\_\_\_\_\_
3. What is evaporation?  
\_\_\_\_\_
4. What is the process called when water moves from plants into the air?  
\_\_\_\_\_
5. Describe the water cycle. Include how water moves into the air and back to Earth.  
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\_\_\_\_\_  
\_\_\_\_\_
6. What is the atmosphere?  
\_\_\_\_\_
7. Describe the three main cloud types.
  - a) \_\_\_\_\_
  - b) \_\_\_\_\_
  - c) \_\_\_\_\_
8. What cloud types occur above 18,000 feet? Include mixed types in your answer.  
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\_\_\_\_\_
9. What happens with nimbostratus clouds?  
\_\_\_\_\_  
\_\_\_\_\_
10. If you see altocumulus clouds on a summer morning, what do you think might happen in the afternoon?  
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11. You have been waiting all summer for the first snowfall. It's almost here! What type of cloud will tell you that snow may be coming, and from what type of cloud will snow fall?  
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\_\_\_\_\_  
\_\_\_\_\_
12. What do the words nimbo and nimbus mean?  
\_\_\_\_\_

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## Answers to **Clouds**

1. 70% of the Earth is covered in water.
2. 97% of water is saltwater and 3% is freshwater.
3. Evaporation is the process through which water moves from being a liquid to being vapor.
4. The process by which water moves from plants into air is called transpiration.
5. The sun heats the water and causes the water to evaporate. Water also enters the air through transpiration. Water vapor moves up through the air until it condenses into clouds. When so much water has condensed that the air cannot hold it any longer precipitation occurs. Water falls back to Earth as rain, snow, sleet or hail.
6. The atmosphere is the blanket of air that covers the Earth.
7. a) Stratus clouds – occur below 6,000 feet and look like flat sheets of clouds. They are usually gray and cover most of the sky.  
b) Cumulus clouds – occur below 6,000 feet and look like fluffy balls of cotton. Usually mean nice weather, but can turn into thunderheads. Flat on the bottom and lumpy on top.  
c) Cirrus clouds – occur above 18,000 feet. Form when water vapor forms ice crystals. They are so thin because there isn't much water vapor above 18,000 feet.
8. Cirrus clouds, altostratus clouds, altocumulus clouds, cirrostratus clouds and cirrocumulus clouds can all form over 18,000 feet.
9. Nimbostratus clouds form below 6,000 feet and produce a steady form of precipitation. They are so thick that you can't see the sun or the moon.
10. Altocumulus clouds on a hot summer morning can mean that a thunderstorm will form in the afternoon.
11. Cirrostratus clouds usually mean that there will be rain or snow in 24 hours, and either nimbostratus or cumulonimbus clouds will bring snow.
12. The words nimbo and nimbus mean 'precipitation producing cloud'.