

How Do Clouds Form?

What are clouds made of? Try asking some adults this question. Most of them will probably say, “Water vapor.” But they’re wrong!

Why are they wrong?

Let’s think about it. We know that water vapor is a gas made up of fast-moving water molecules that travel around freely in all directions in the air.



STOP AND THINK

Can we see molecules of water vapor in the air?
Can we see clouds?



Photo courtesy of Pixabay.com

We can’t see water vapor, but we **can** see clouds. So clouds must be made of something we can see. Little children sometimes think that clouds are made of cotton balls or marshmallows. But we know that rain comes from clouds, so the answer must have something to do with water.

In fact, clouds are made of many, many tiny droplets of liquid water. How do those droplets of liquid water get there?

Liquid water exists in lots of places on Earth—in the ocean, in lakes, in streams, in your yard, on the playground, and on trees, for example. Some of these water molecules in the liquid state gain enough energy and speed to escape from the other water molecules during evaporation, and they continue moving rapidly in the air as water vapor (a gas we can't see).

Some of these water-vapor molecules move high up into the atmosphere where it's really cold. As the water-vapor molecules cool, they start to lose heat energy, slow down, become attracted to each other, and join together to form small droplets of liquid water that attach themselves to tiny pieces of dust in the air during condensation.

When you look at a cloud, you're seeing lots of tiny liquid-water droplets! If you could walk through a cloud, you would get wet from touching these tiny water drops.*

So clouds are formed by two processes: evaporation and condensation. In evaporation, fast-moving liquid-water molecules from Earth change state from a liquid to a gas as they gain heat energy. These water-vapor molecules rise up into the colder air where they lose energy, slow down, and join together (condense) to form tiny droplets of liquid water.

Evaporation + **Condensation** = **Clouds!**
(From Earth) (On dust particles in the cold air) (Tiny drops of liquid water)

*If the air high up in the sky is **really** cold, water-vapor molecules freeze on the dust particles and form snow, which means they change state from a gas to a solid.