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Why Don't Clouds Fall Out of the Sky?

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All of you have seen big, puffy clouds “floating” in the sky on a summer’s day. Why do clouds stay in the sky? Why don’t they fall down?

Maybe clouds “float” for the same reason that helium balloons float. Maybe they are lighter than air. That can’t be true because we know that clouds are made of water. Water is not lighter than air - water does not float. So why don’t clouds fall out of the sky?

The two biggest reasons that clouds stay in the sky are 1) small drops, and 2) wind.

Small drops of water fall more slowly than big drops. The reason is that as drops fall through the air, the air pushes back on them. Because small drops have less mass and more surface area than large drops, they have a harder time pushing the air out of the way.

Activities:

1) You will need a clear beaker of water, a small rock, and some sand. Drop the rock into the water. Next, scatter the sand into the water. The sand and rock have to push the water out of the way as they fall, just like drops of water have to push air out their way. Which takes longer to reach the bottom? (As long as the water is murky, there is still sand in it.)

2) Take two sheets of notebook paper. Wad one into a tight ball. Cut the other into confetti. Dump them out of a bowl. Which hits the floor first?

3) Take an adjustable squirt bottle. Loosen the nozzle so that you get big drops. Squirt a few out. Now, tighten the nozzle almost all the way down. You should get a fine mist. Which drops fall faster?

We hope you’ve convinced yourself that small drops will fall more slowly than big ones. They still fall though. So, even if clouds are made up of small drops of water (which they are), they should still fall out of the sky. The second part of the answer to our puzzle is wind.

The kind of wind that most of us are most familiar with is the kind that blows “side-to-side” along the ground. However, the wind sometimes blows up, away from the ground. These updrafts, as they are called, can suspend small drops, preventing them from falling down.

Activities:

1) Fly a kite. If the wind can keep a kite up in the air, it can keep very small water drops up in the air.

2) Take a funnel and put a short length of flexible tubing onto it. Put a baseball in the funnel. Try to move the baseball by blowing into the tubing. Replace the baseball with a ping pong ball. Try to move it by blowing into the tubing. You should be able to move the smaller, lighter object. Wind does essentially the same thing with cloud drops.

As you have just seen, clouds stay in the sky because they are made of small drops that are kept from falling by updrafts. Here is something to think about though. Sometimes cloud drops do get big enough to fall, even though the wind is trying to keep them suspended in the sky. Those big drops are called.... rain.