

***** Adult supervision is required! *****

Cloud in a Bottle by Steve Spangler

Have you ever wondered how clouds form? Clouds are formed when water vapor is cooled enough to form tiny water droplets. This is exactly what happens when moist air rises in the atmosphere, cools, and water droplets form into clouds. Making your own cloud is a popular experiment in many science books, but you should know that the results are not very striking. Yes, you'll see a very faint cloud (very faint), but it's a little tricky.

Materials

- 1-liter clear plastic bottle with cap
- Water
- Matches



1. Place just enough warm water in the bottle to cover the bottom.
2. The goal of this next step is to get some smoke particles into the bottle. Light a match and let it burn for a few seconds. Blow the match out and immediately place the head of the match in the bottle. Let the smoke from the match fill the bottle. After a few seconds, the smoke will seem to disappear, but the invisible particles are still floating around in the bottle. All of this happens fairly quickly.
3. Screw the cap on the bottle being careful not to let too much smoke out of the bottle.
4. Squeeze the sides of the bottle really hard 6 or 7 times (more squeezing may be necessary). Squeeze the bottle again, hold the squeeze for a few seconds and then quickly release the squeeze. The second you release the squeeze, you should see the formation of a little fog in the bottle. This is the cloud!

How does it work?

Even though we don't see them, water molecules are in the air all around us it's called water vapor. When the molecules are bouncing around in the atmosphere, they don't normally stick together. Squeezing the sides of the bottle forces the molecules to squeeze together or compress. Releasing the pressure allows the air to expand, and in doing so, the temperature of the air becomes cooler. This cooling process allows the molecules to stick together more easily forming tiny droplets and clouds are nothing more than tiny water droplets!

The smoke in the bottle also helps this process. Water particles will group together more easily if there are some solid particles in the air to act as a nucleus. The invisible particles serve as the nucleus and help in the formation of the cloud. Clouds on Earth form when warm air rises and its pressure is reduced. The air expands and cools, and clouds form as the temperature drops below the dew point. The invisible particles in the air may be in the form of pollution, smoke, dust or even tiny particles of dirt.

And watch clouds form at fast-forward speed! With parent permission, go to:

"Thunderstorm Time Lapse."

<http://www.youtube.com/watch?v=cl0aw87LqA&feature=related>

"Timelapse of Tucson cloud formations."

<http://www.youtube.com/watch?v=NiCSk1zxMEs>