UNIVERSITY OF CENTRAL LANCASHIRE

LANCASHIRE SCIENCE FESTIVAL

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CLOUD IN A JAR

Making a rain cloud in a jar is a great way to see how actual clouds in the sky are created. Clouds are tiny collections of water droplets which are formed when warm air that has been heated by the Sun meets colder damp air from the ground.

What you will need – ASK AN ADULT BEFORE STARTING THIS EXPERIMENT:

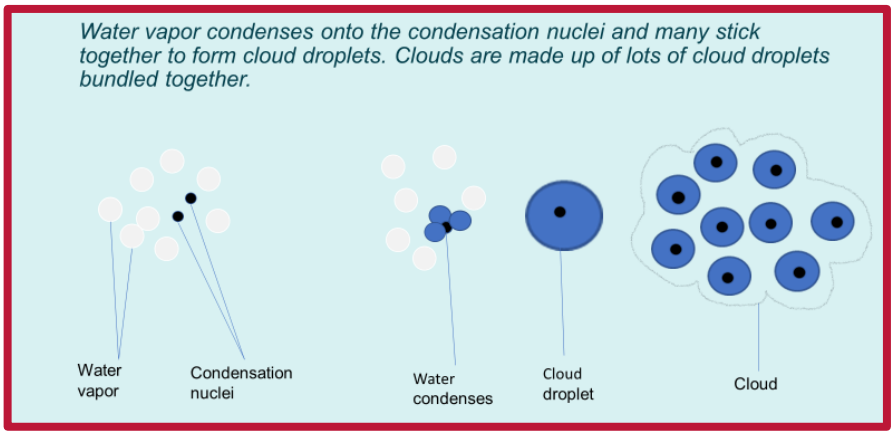
- An adult to help
- Glass container and a lid (jam or coffee jar)
- Hot Water
- Aerosol (e.g. air freshener)
- 3-5 cubes of Ice

BE CAREFUL! An adult should pour the hot water. The jar will get hot.

What to do:

1. Pour hot water into a glass jar until one quarter full.
2. Place the lid upside down onto the jar.
3. Carefully add the ice to the lid and observe what happens in the jar.
4. Lift the lid and spray aerosol into the jar. Replace the lid, with the ice resting in it, back on top of the jar.
5. Watch the jar carefully and you will see a cloud begin to form.
6. Put your jar in front of a dark piece of paper and you'll be able to see the cloud even more clearly.
7. After observing the swirling cloud in the jar, remove the lid and watch the cloud escape out of the jar.

This is what happens to make your cloud:
By pouring hot water into a jar and trapping it, you create warm, moist air (water vapor).
Once it reaches the top of the jar, the warm air collides with the cooler air near the ice cubes.
Water vapor condenses when it cools down. However, a cloud can only form if the water vapor has something to condense on to. In nature, water vapor may condense on particles like dust, air pollution, pollen and volcanic ash. In this activity, the water vapor condenses onto the air freshener forming a cloud in the jar.
The aerosol particles from the spray act as cloud condensation nuclei, allowing the water molecules to condense and stick together and become bigger droplets of water which are much easier to see.
The jar gradually becomes cloudier as more and more water condenses to make bigger droplets.



If you observe the cloud carefully, you will notice that it moves around the jar. This movement is caused by a convection current which is set up when warm air rises and cold air sinks.

The experiment provides the three ingredients the atmosphere needs to create a cloud:
1. Warm, moist air (from the boiling water).
2. Cooling (from the ice cubes).
3. Cloud condensation nuclei (from the aerosol air freshener).

Further experiment ideas:

- Use water of different temperatures, how does that affect the cloud in your jar?
- What if you used something other than an air freshener, maybe hairspray or other aerosol, for cloud condensation nuclei? How would that affect cloud formation?