RMetS
Royal Meteorological Society

Make your own Cloud in a Bottle

To see how clouds form

Equipment

- ◊ A one litre plastic water bottle (with a lid)
- ◊ Warm water
- ◊ Matches
- ◊ Optional thermometer (small enough to into the bottle)

Method

1. If you have a thermometer, put it in the bottle and close the lid tightly. Write down the temperature. See what happens to it as you squeeze the bottle. You should see the temperature increase as the bottle is squeezed and the air inside it is compressed (squashed).

2. Fill the bottle with a few drops of warm water, and put the lid on again. Squeeze the bottle many times and watch what happens.

3. As the warm water evaporates, the amount of water vapour in the air in the bottle increases. When you release the bottle, the pressure, and temperature in the bottle drops. BUT you will not see any clouds forming despite the fact that the air in the bottle is almost certainly saturated with water vapour.

4. Now open the bottle, and light a match (get an adult to help with this step). Hold the match near the mouth of the bottle, then blow it out, holding the smoking end of the match in the bottle for a few seconds before quickly closing the lid tightly.

5. Squeeze and release the sides of the bottle a few times. Now what happens when you squeeze the bottle hard for a few seconds and then suddenly release the bottle? You should see a cloud forming in the bottle when you release it, as the water vapour now has small particles (smoke, soot, ash), known as Cloud Condensation Nuclei, to condense on.

How does this relate to the atmosphere?

Source: http://www.stevespanglerscience.com/img/cache/bcb9b8db117ee64376aedaf7af3595ca/cloud-in-a-bottle-7-14-09.jpg

Clouds can only form when the air is saturated with water vapour and when there are condensation nuclei present. Cloud seeding experiments introduce extra Cloud Condensation Nuclei to the atmosphere, to influence the number and size of raindrops in a cloud.

Where can I find more information?

http://www.metlink.org/weather-climate-resources-teachers/useful-links.html#clouds

http://www.sciencemuseum.org.uk/antenna/climatechange/Cip5/231.asp

http://www.usatoday.com/news/world/2006-06-29-china-rain_x.htm