RMetS
Royal Meteorological Society

Hot Air Rises

Learn about convection

Equipment

- ◊ A large, wide mouthed jar (maybe a jam jar)
- ◊ A baby food jar
- ◊ String
- ◊ Water
- ◊ 2 different colours of food colouring

Method

1. Tie the string around the top of the smaller jar, making sure the end is long enough to lower the smaller jar to the bottom of the larger jar.

2. 2/3 fill the larger jar with cold water and some yellow food colouring.

3. Please get an adult to help with this step. Fill the small jar with some red food colouring and boiling hot water.

4. Please get an adult to help with this step. Carefully lower the smaller jar using the piece of string into the larger jar.

5. Watch what happens!

What should have happened

The hot red water will have risen through the colder yellow water. This will have left a red-orange layer on the top of the yellow. The hot water is less dense than the cold water, so it rises above it.

How does this relate to the atmosphere?

In the same way that the hot water rose through the cold water, in the atmosphere warm air rises through colder air. This is the process by which clouds can form and is known as convection. Air near the ground is heated by the sun throughout the day and rises through the cold air. This is the same mechanism that hot air balloons rely on.

Try this:

Try the experiment the other way round. Fill the larger jar with boiling water and the smaller with cold water. The colder, more dense water will be trapped at the bottom of the jar.

Where can I find more information?

For more information on convection and clouds see here:
http://cloudappreciationsociety.org/september-09/

For another convection experiment, try making a tea bag rocket
http://www.metlink.org/pdf/teenagers/experiments/Teabag_rocket.pdf

To find out how a hot air balloon works in detail please see here:
http://www.eballoon.org/balloon/how-it-works.html