

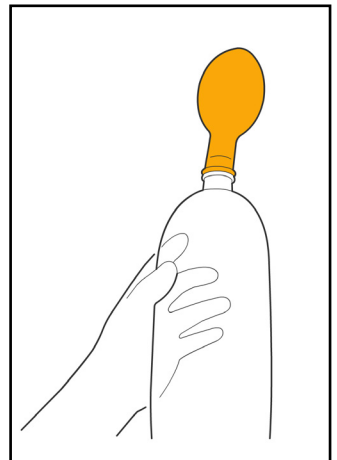
Learn about air pressure

Equipment

- An empty, plastic 2 litre bottle
- A balloon
- Ice cubes or Fridge
- Hot Water

Instructions

1. Remove the lid and put the empty bottle in a freezer or on a bed of ice for at least 10 minutes to let it really cool down.
2. Now quickly put the balloon over the mouth of the bottle.
3. With the balloon over the mouth of the bottle, ask an adult to pour very hot water over the sides of the bottle.
4. Observe what happens. Cold air is more dense than warm air, so as the air in the bottle warms, it expands.



How does this relate to the atmosphere?

The fact that air expands as it gets warmer and contracts as it cools is a very important process in the Earth's atmosphere.

When air is heated by the ground it expands and rises. If air pressure is simply a measure of how much air there is above, then as the hot air rises, the air pressure will fall. As the air pressure falls, the air will cool, eventually reaching the temperature at which cloud droplets form.

Why do we associate cloud with low pressure systems?

Where the air pressure is low at the surface, air is sucked in from surrounding higher pressure areas. This air has to go somewhere, and so it rises, frequently forming cloud.

Conversely in high pressure areas, the air is being pushed out at the surface (towards lower pressure areas), and so air sinks from higher up in the atmosphere to replace it. As the air sinks down towards the surface, the pressure increases and so its temperature rises, creating conditions where cloud droplets are very unlikely to form.

What do the lines on weather charts mean?

These lines are called isobars and they join places with equal sea-level pressures. Closely spaced isobars indicate large pressure changes over a small area and suggest strengthening winds.

Other experiments to learn about air pressure

Have a look at some of our other experiments on MetLink.org – Have a go at making a barometer, see if you can get an egg into a bottle or ask how heavy the air is. All these experiments explore the concept of air pressure.

About the Royal Meteorological Society

The Royal Meteorological Society is the Learned and Professional Society for weather and climate. Our mission is to promote meteorology as a science, profession and interest. The Society is open to anyone whose profession or interests are connected with weather and climate.

About Bramwell Brown Mechanimated Clocks

Bramwell Brown's Weather Clocks are innovative reinventions of the traditional barometer, combining a nostalgia for curious mechanical objects with highly innovative British design. Bramwell Brown clocks are totally unique in the world, yet complementary to the modern home or place of work.