Build a model lung

Make a model lung you can inflate and deflate.

What you need

- 2 litre plastic bottle • Straws • Scissors • Quality tape • 3 large balloons • Plasticine/Blue Tac • Elastic bands

1. Cut the bottom off the 2 litre bottle, make the cut a smooth as possible.

2. **Create a Y shaped connector.**
Cut one straw open (1cm from the end) and fold it out to create two small legs to make a Y. Cut 8cm off the 2nd straw, gently fold in half and cut out a 2cm diamond shape (fold is in the middle). Place Y of straw 1 over the diamond shaped hole in straw 2 and tape it in place. Make the seal airtight.

3. Add a balloon to each end of the Y-shaped connector. Secure in place with tape or elastic bands..

4. Place the balloon and straw connector structure inside the plastic bottle. Carefully thread the long straw portion through the neck of the bottle.

5. Create an airtight seal around the straw and bottle using tape. Alternatively, drill a hole in bottle top to thread straw through and seal with plasticine/Blu Tac.

6. Tie a knot at the end of remaining balloon, cut balloon in half across largest part. Stretch the balloon, with knot on outside, across bottom of bottle opening. Tape in place.

USE

Gently pull down on the balloon using the knot. This should cause air to be drawn into the lungs (balloons within your model). Release the knot and watch as the air is expelled (balloons deflate).

The Science

The respiratory system supplies the body with the vital oxygen that the body's organ needs. When we breathe we take in air through our nose and mouth, and this is passes via the larynx to the windpipe (trachea). The tube is split into two smaller branches, the bronchi, which goes into the lungs and divides again and again (bronchioles). The bronchioles have air filled sacs called alveoli which are surrounded by tiny capillaries carrying blood. Oxygen diffuses across the alveoli membrane through the capillary wall into the blood to be captured by red blood cells and distributed to our organs.
When we breathe in (inhalation) the sheet of muscles (diaphragm) contract pulling the air into the lungs, and when we breathe out (exhalation) the diaphragm relaxes allowing the lungs to deflate.

Structure of the system

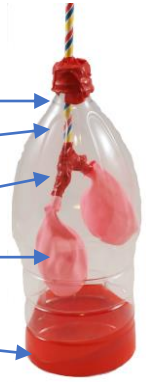
Chest cavity = plastic bottle

Windpipe = straw

Bronchi = Y shaped connector

Lung = balloon inside bottle

Diaphragm = balloon over bottom of bottle



WHAT HAPPENS WHEN I PULL DOWN ON THE BALLOON?

Inhalation: The volume of the bottle (chest cavity) increases which lowers the pressure in the lungs. Lower pressure causes air to be drawn into the lungs and the lungs (balloons) expand as they fill with air.

WHAT HAPPENS WHEN I RELEASE THE BALLOON?

Exhalation: The volume of the bottle (chest cavity) decreases, forcing air out of the lungs. The lungs (balloons) contract, returning to their original size.