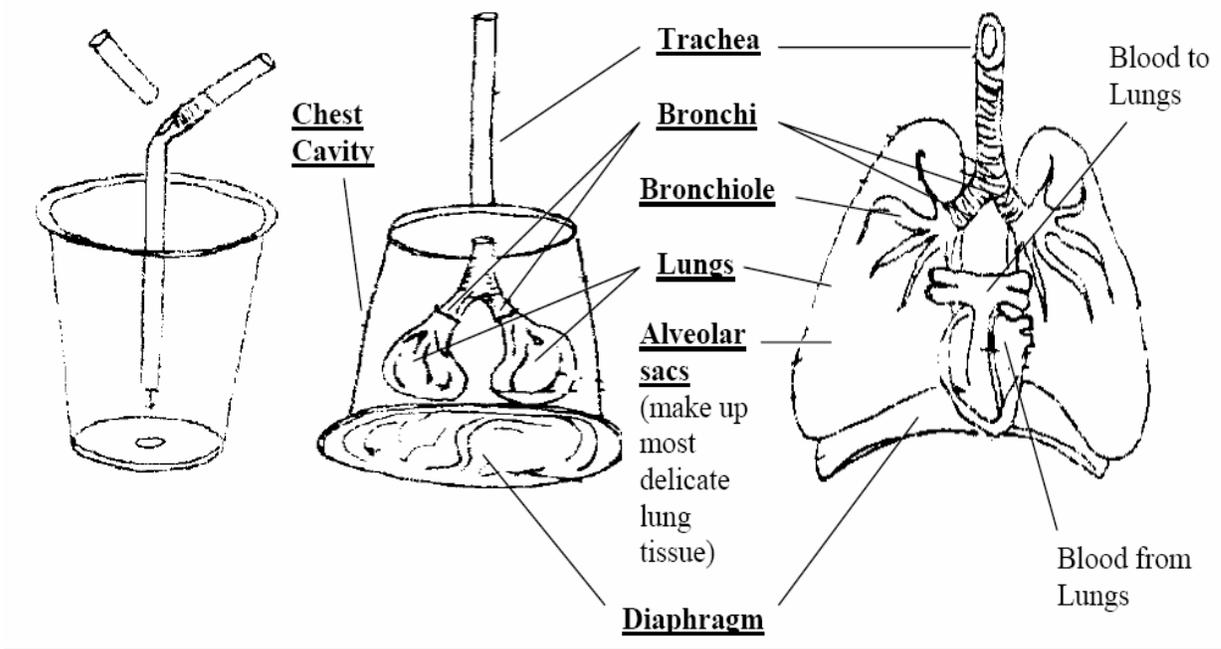


Your Lungs

... a working model



Materials Required:

- 1) Plastic cup – 1
- 2) Straws – 2
- 3) Balloons – 2 small and 1 large
- 4) Scissors or Knife
- 5) Tape
- 6) Rubber band
- 7) A lump of plasticine/clay

Instructions

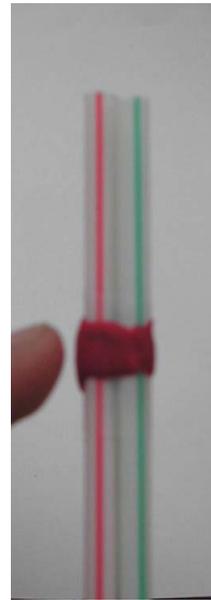
Step 1:

Make a hole at the bottom of the plastic cup with scissors.



Step 2:

Wrap the lump of clay/plasticine around the 2 straws. Also use the tape to make it airtight seal.



Step 3:

Attach the smaller balloons to the ends of the two straws.



Step 4:

Place the straw through the cup such that the “lungs” are inside the cup. Place the straw such that the junction in “Y” is toward the bottom of the cup, with a couple inches of the 2 straws are sticking through the hole and the hole is completely sealed.



Step5:

Cut the neck off the large balloon and discard.



Step 6:

Take the remainder of the balloon and cover the open end of the cup. Use a rubber band or a tape to hold the balloon piece on.



Final prepared model



To Do and Notice:

Push the membrane in, watch the “lungs” deflate, pull the membrane out, and watch the “lungs” slightly inflate. If it does not work, recheck all of the seals to see if any air is leaking from the lung model.

Science/Math behind the Activity

Our lungs inhale and exhale with the help of pressure differences between the outside air and the pressure in the sealed lung cavity (pleural). The cup represents the lung cavity and the straw represents your trachea, which is the tube that carries air into and out of your lungs. The small balloons represent the lungs themselves, and the large balloon represents the diaphragm, which is the large, flat muscle that sits below your lungs and above your stomach.

When you push up on the large balloon, you simulate the diaphragm muscle pushing up into the lung cavity. This makes the volume inside the lung cavity decrease, which causes the air pressure in the lung cavity to increase. The pressure inside your lung cavity is now greater than the pressure outside (the atmospheric pressure), and so the air rushes out of your lungs as it goes from an area of high pressure to an area of lower pressure to equalize the pressure. This is how we EXHALE.

Pulling down on the membrane simulates the contraction of the diaphragm muscle, which causes it to pull down away from the lung cavity. This causes the volume inside the lung cavity to increase, which decreases the pressure. The pressure inside your lung cavity is now less than the pressure outside (atmospheric pressure). This causes air to move into the lungs to expand the lungs. This is how we INHALE.