RAFT IDEAS

Topics: Anatomy, Heath, Lung structure & Function, Air Pressure

Materials List

- ✓ Plastic cup (clear)
- ✓ Plastic straw
- ✓ Larger balloon or latex glove piece
- ✓ Two small balloons to serve as lungs
- ✓ Hot glue gun
- ✓ Tape
- ✓ Optional: rubber band

This activity can be used to teach:

- Lung Structure and Function (CA Science Standards: Grade 5, 2.b)
- Health and Drug Awareness (Upper Elementary and above)

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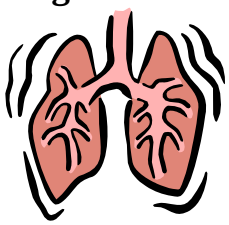
Breathe In, Breathe Out

Creating a Model Lung



Each day in your life you breathe in and out approximately 20,000 times, usually without thinking about it. Here is a chance to discover how breathing works.

Assembly

1. Use the tip of a hot glue gun or a hot soldering iron to melt a hole in the bottom of the cup large enough to insert a straw.
2. Cut the straw into three pieces; one piece should be about 8 cm (~3") long, the other two should be 2.5 cm (~1") long. Assemble the straw pieces into a Y shape, with the short pieces serving as the branches of the Y, feeding into the longer piece. Tape the pieces together into place.
3. Attach the two small balloons to the ends of the small straw pieces. Place the long straw piece through the cup such that the balloons (modeling the lungs) are inside the cup. Use the glue gun to secure the straw in place such that the junction in the Y is toward the bottom of the cup, with a couple inches of straw sticking through the hole and the hole is completely sealed.
4. Stretch a piece from the larger balloon or glove across the open end of the cup to form a taut membrane and secure in place with a rubber band or tape.

To Do and Notice

Push the membrane in, watch the "lungs" deflate; pull the membrane out, watch the "lungs" slightly inflate. Note: If the model does not work, recheck all of the seals to see if any air is leaking from the lung model.

The Science 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; the straw represents the trachea, the tube that carries air into and out of the lungs; the small balloons represent the lungs themselves; and the large balloon represents the diaphragm, the large, flat muscle below the lungs.

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, causing 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 higher 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 and expand the lungs. This is how we INHALE.

Web Resources - Visit www.raft.net/more for how-to videos and more ideas!

Instructions by RAFT Education Department