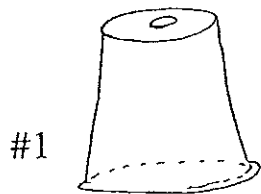


Nature Kids: Make a Model Lung

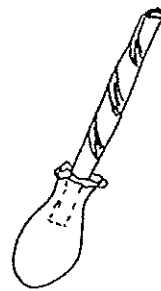
Have you ever wondered how your body makes the air go into and out of your lungs? Build this model and find out how a muscle called the DIAPHRAGM helps pull air into your lungs and push it out again.

You will need:

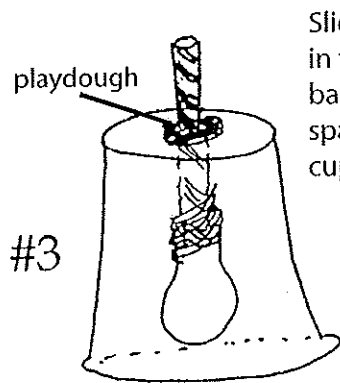
- * A clear plastic cup (the soft plastic kind, not brittle, stiff cups)
- * One small balloon (like a water balloon)
- * One 9" or larger balloon
- * One straw
- * A little bit of non-hardening clay or playdough
- * Tape



With help from an adult, poke a hole in the middle of the bottom of the cup. You can use a skewer, pencil or Exacto blade for this (#1)

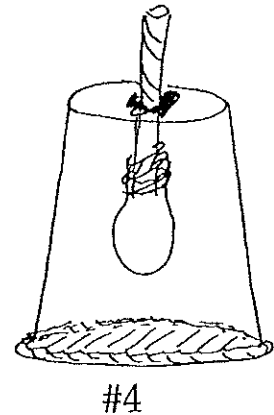


Slip the small balloon onto one end of the straw and tape it securely (#2)



Slide the straw through the hole in the cup so that the small balloon is inside the cup. Seal the space between the straw and the cup with clay or playdough (#3)

Cut a section of the big balloon that is larger than the diameter of the cup opening. Stretch it across the cup opening so it is fairly tight (#4)



Now your model is ready: the straw is your **throat**, the small balloon is a **lung**, the cup represents the **ribcage**, and the large balloon section is the **diaphragm**.

Pull down (gently) on the "diaphragm" and watch the "lung" fill up with air. Release the "diaphragm" and the air is pushed out.

If you like, you can draw ribs on the cup with a paint pen or permanent marker. You might even make a "breathing" doll or puppet!

See the **Teacher's Corner** for more information about the diaphragm and breathing.

Fun Lung Facts



Your lungs have 300,000,000 (300 million!) alveoli – little bags where the oxygen goes into the blood and the carbon dioxide comes out.



The surface area of your lungs could cover a tennis court!



The highest recorded "sneeze speed" is 102 miles per hour (165 km per hour).

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Teacher's Corner: Catch Your Breath

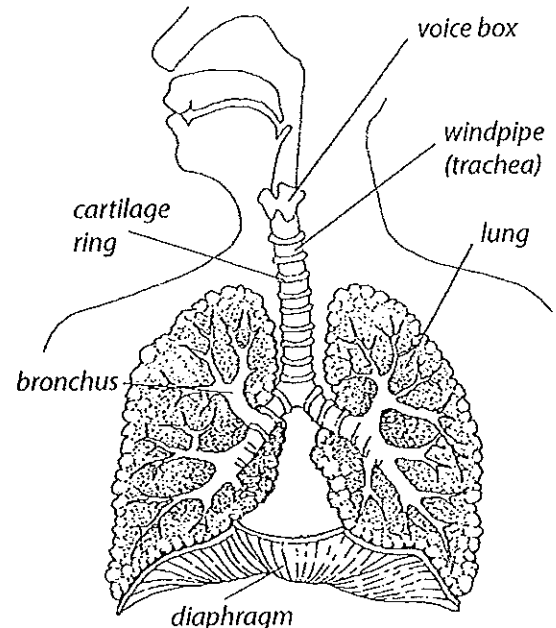
By Jenni Malone, NDC Director

Don't you just hate it when you get the hiccups? Why couldn't we just do without the muscle that causes hiccups? Which muscle is it anyway?

The muscle that causes hiccups is called the **diaphragm**, and the fact is, we couldn't do very well without it. It is a very important muscle that helps us breathe.

The **diaphragm** is a flat sheet of muscle that forms the bottom of the chest cavity. When it is relaxed, it bows upward making a convex floor to the chest cavity (see illustration). It attaches around the edge to the ribcage. When we **inhale**, the diaphragm *contracts*, shortening and flattening (pulling down) which makes the chest cavity above it larger. This creates a vacuum that pulls air into the lungs. When we **exhale**, the diaphragm *relaxes*, bowing up again and forcing air out of the lungs. The lungs themselves are not made of muscle tissue; they cannot expand or contract on their own.

Aiding the diaphragm in creating the vacuum in the chest cavity are the rib muscles, which contract to pull the ribs up and out, expanding the chest cavity further. You can see these muscles working together fairly easily when you watch someone breathing as they sleep.



Most of the time we are not particularly aware of the diaphragm. But when we get the hiccups, we become VERY aware of it. Hiccups are the result of spasms of the diaphragm. The muscle contracts suddenly, sucking air into the lungs very quickly. The sudden flow of air over the larynx causes the vocal chords to vibrate (the "hic").

All this muscle work is actually only the beginning of breathing. The **respiratory system's** main task is to supply the blood with oxygen and rid it of waste gases (primarily carbon dioxide). When we inhale, the air flows in through the mouth and nose, down the **trachea** and into two **bronchi** to the **lungs**. Each bronchi enters a lung and begins to branch out into increasingly smaller bronchioles. The final branches are called the **terminal bronchioles**. Each terminal bronchiole is less than .5 mm in diameter. The terminal bronchioles lead into **respiratory bronchioles**, and this is where respiration actually begins. Respiratory bronchioles have a lining that is covered with thin-skinned air sacs. These sacs contain the **alveoli**, which are small curves or mini cul-de-sacs in the sac lining. The alveoli are covered with tiny, interconnecting capillaries through which the blood flows. The capillary and alveoli walls form a permeable membrane through which gasses can diffuse into and out of the blood. Altogether, your lungs have more than 300,000,000 (300 million) alveoli. The total surface area of the lungs, though difficult to measure exactly, is about the size of a tennis court! The diffusion of gases from your lungs to your blood is pretty efficient; enough so that the air you exhale contains 100 times more carbon dioxide than the inhaled air.

So the next time you get the hiccups, remember what an important job your diaphragm does, and try your favorite family remedy.

Is one of these your family's favorite?

- * Eat a spoonful of sugar.
- * Drink water from the opposite side of a glass.
- * Hold your breath through the next hiccup.



See **Nature Kids**
for a cool related craft.

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