

BUILD A MODEL LUNG



MAKE & TAKE KIT!

AVAILABLE AT YOUR LOCAL LIBRARY

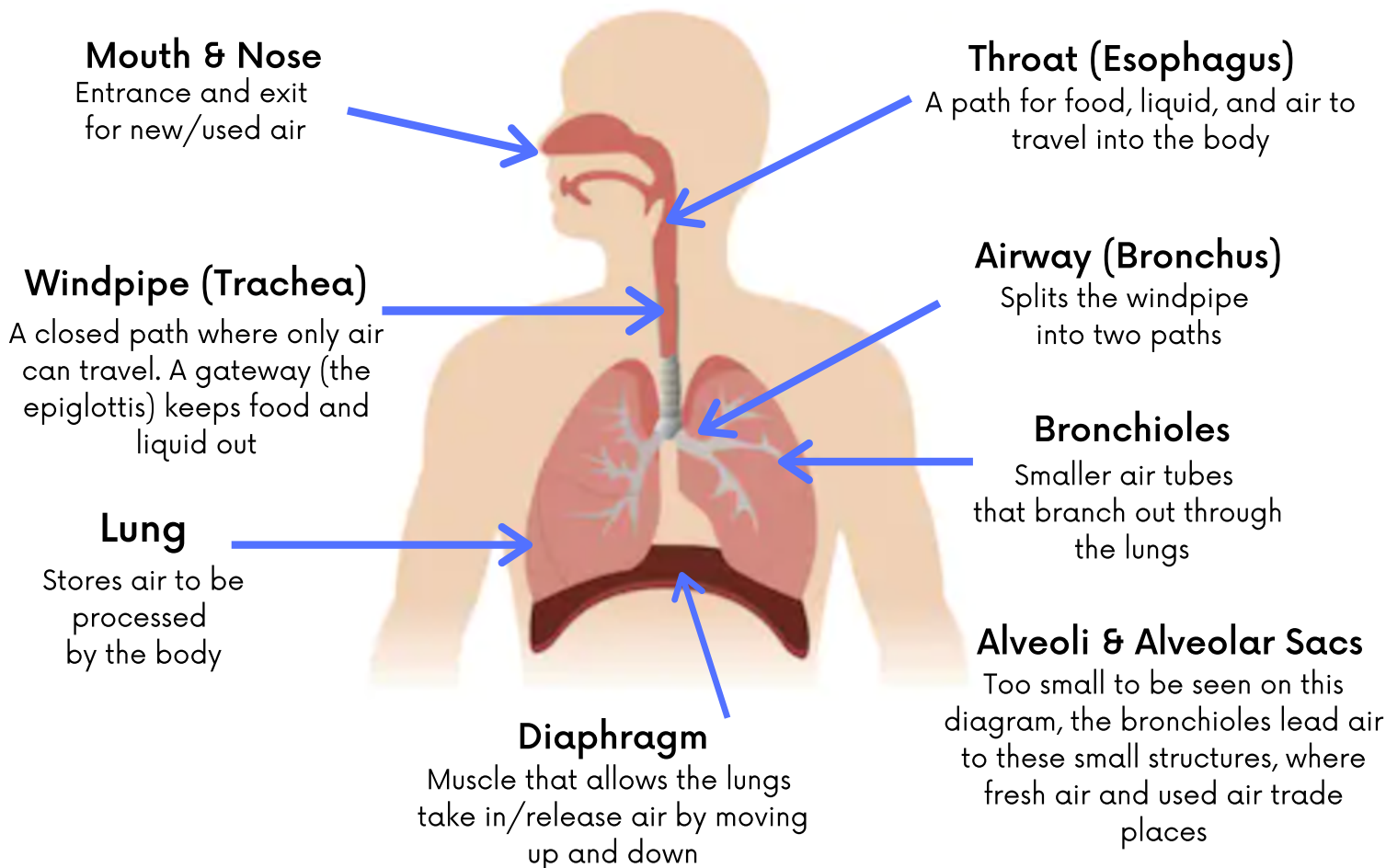
Build with Josette, AQ Intern
<https://youtu.be/MOIZIZA+Hh4>



Presented by
Nez Perce Tribe ERWM Air Quality Program
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THE RESPIRATORY SYSTEM

The human body is made up of smaller teams that we call organ systems. Breathing is the main job of the respiratory system. Let's take a look at the different parts and functions of our respiratory system.



It can be easier to think about the respiratory system as a system of roads. Think about air we breathe in, mainly Oxygen and Nitrogen, as a blue car. This car starts on a big freeway (the atmosphere!). Then, it exits the freeway onto a major road (the throat and windpipe). The car keeps going, and the big road forks in two (the bronchus). The car either goes left or right, and drives down a small neighborhood street (bronchioles). Finally, it parks in a driveway (alveoli)!

There are three major steps in the respiration process:

INHALATION

(breathing in)

- Fresh air enters the lungs
- Blue car drives to the house from the freeway
- Blue arrows

GAS EXCHANGE

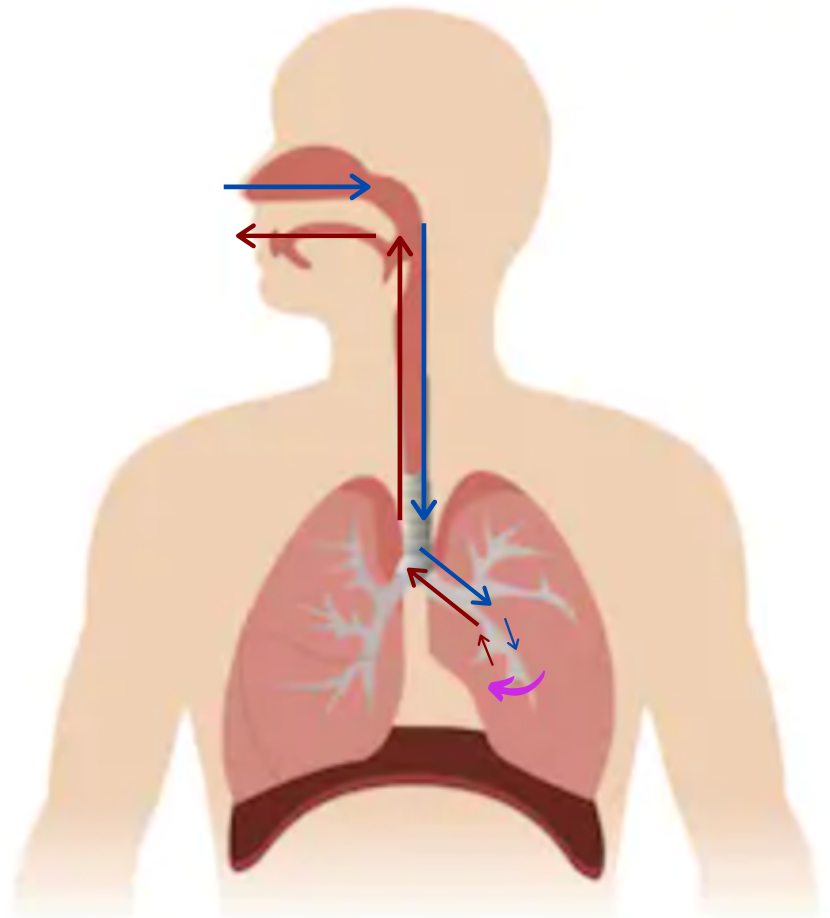
(processing air)

- The body processes the Oxygen and Nitrogen, producing Carbon Dioxide
- Purple arrow

EXHALATION

(breathing out)

- Used air leaves the body



Check out this video to learn more!

Ted-ED How do Lungs Work?

https://www.youtube.com/watch?v=8NUxvJS-_0k

Try it!

Lie down on the floor. Put your hand (palm down) on your belly button. Try breathing in slowly through your nose and exhaling slowly through your mouth. What processes can you feel? What processes can't you feel?

THE RESPIRATORY SYSTEM

Build it!

For help building or to see how to make a bigger model:

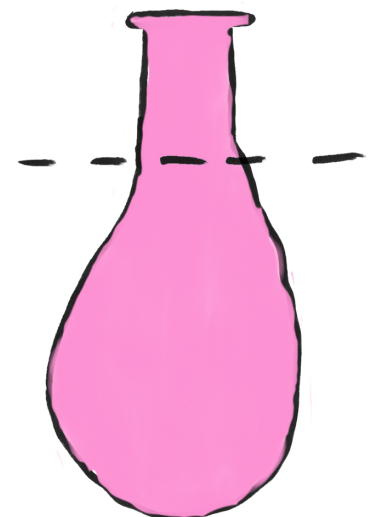
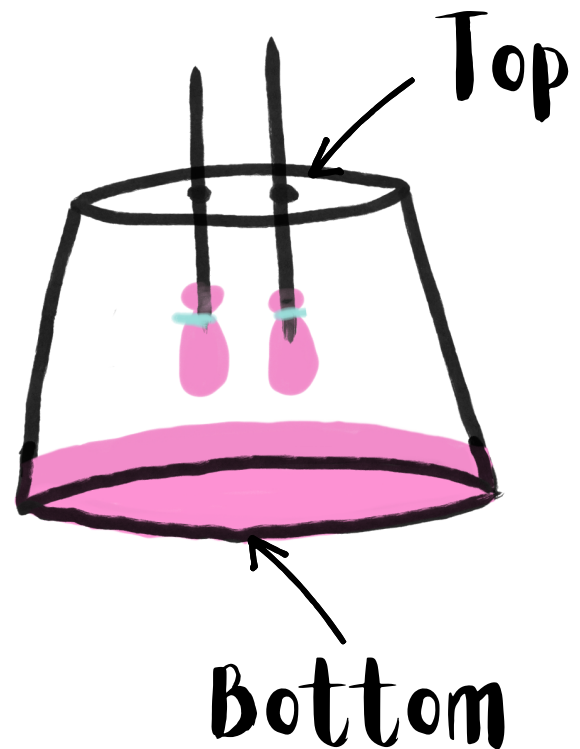
<https://youtu.be/MOIZIZAtHh4>

Materials

- Plastic cup
- Coffee stirrer (cut in half)
- Water balloons (2)
- Small rubber band (2)
- 9 or 12 inch balloon
- Scissors

Instructions:

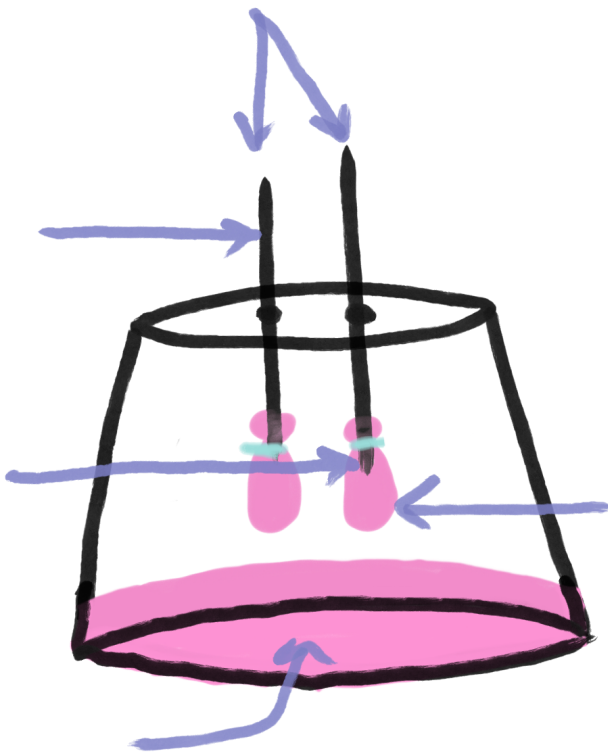
1. Poke two holes, about one inch apart, in the top of your cup, about the same size as the coffee stirrer. (if you accidentally poke the hole too big, you can fill in the extra space with play-doh)
2. Put one end of each coffee stirrer through the holes in the cup.
3. Put one water balloon onto the end of the coffee stirrer. Secure with the small elastic. Repeat for the other coffee stirrer. See the pictures for reference.
4. Cut the balloon just where it starts to curve. See the picture to the right for reference.
5. Have a partner hold the cup still while you wrap the balloon around the bottom edge of the cup. Make sure that the balloon is securely around the cup.



THE RESPIRATORY SYSTEM

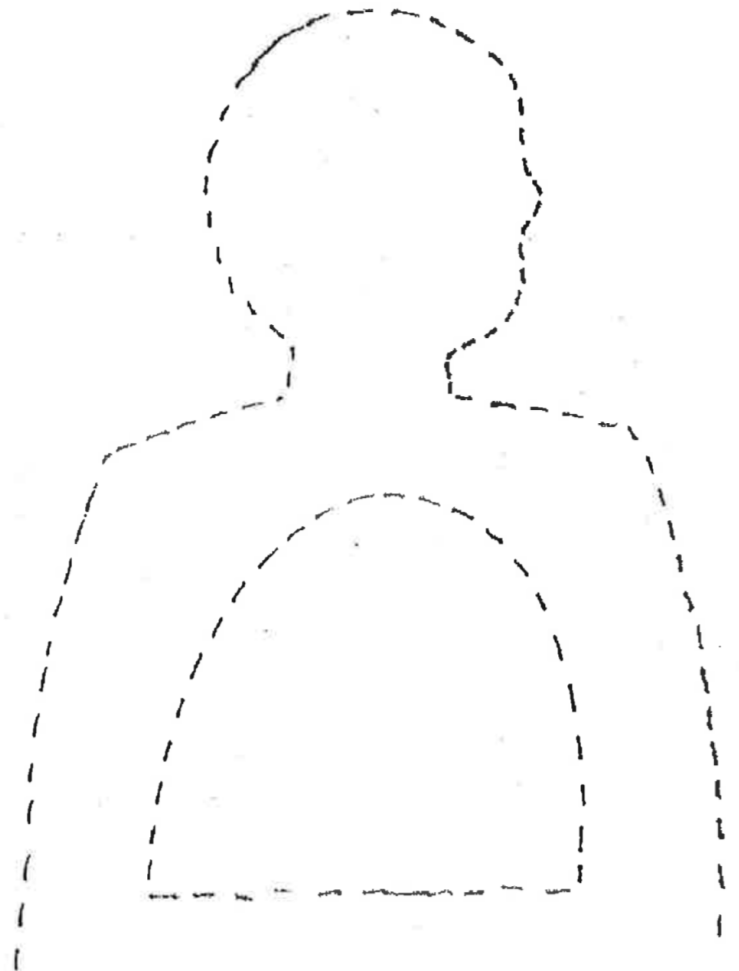
Use it!

Now, let's make our model breathe! Pull down on the bottom balloon to see what happens when you inhale. Push up to see what happens when you exhale. How is this similar to what you felt during the breathing exercise? **Label the model with the real body parts they represent. (Hint: not all the body parts on the previous picture are shown by this model)**



More fun!

Personalize your Respiratory System with a fun character! Draw whatever you want on your character, cut it out, and put it on your model to make it come to life!



THE RESPIRATORY SYSTEM

Investigate!

We can use our model to learn more about the respiratory system. Look at the questions below. You can try the experiments, and use the final box (next page) to write out your findings.

Questions

How does the size of your lungs affect your breathing?
How does the size of your airway affect your breathing?
How might dirty air affect your breathing?



Experiment

Could we put a bigger balloon on our model instead of water balloons?
Could we put a wider straw in the model instead of a coffee stirrer? What would happen if we tried?
Could we put some sand in the airway of our model?

THE RESPIRATORY SYSTEM

Conclusions

Air Pollution and Our Lungs

The sand we put in our model is similar to what we call "coarse particulate matter" (PM 10). This type of PM is inhalable, meaning you can breathe it in. Fine PM (PM 2.5) is much smaller. It is respirable, traveling deep into the lungs. Imagine something so small it could pass through the surface of the balloon without popping it. Check out the EPA: Particulate Matter Basics website to learn more.

<https://www.epa.gov/pm-pollution/particulate-matter-pm-basics>

What is the air quality like in your local region? Find out at this link!

<https://www.airnow.gov/>

With modified materials, you can build an even larger model chest cavity, like the one shown here! Find instructions at:

<https://tinyurl.com/ybtyqnuX>

