Robogals Science Challenge

Minor Challenge - Activity Sheet

STEM Field	Biomedical Engineering
Challenge Name	Build Your Own Lung Model
Challenge Level	Junior
Project Cost (approx)	0 - 20 USD
Materials Required	• 1x empty plastic bottle, or plastic cup • 1x straw • 2x deflated balloons • Tape • Scissors
Safety	Adult assistance is required when handling scissors or other sharp objects.
Duration (approx)	1 - 2 hours

*Some adult supervision is advised with the scissors

Introduction

Did you know your body needs air even more than food or water?

Most people can live for weeks without food and a few days without water... but only a few minutes without air!

We breathe in and out all the time — about 15 to 25 breaths every minute — even when we're not thinking about it. Our bodies need oxygen (a special part of the air) to work properly. Oxygen gives us energy to run, play, think, and grow!

When we breathe in, our lungs fill up with air and take the oxygen our body needs. The oxygen travels around our body in our blood. When we breathe out, our lungs send out a waste gas called carbon dioxide.

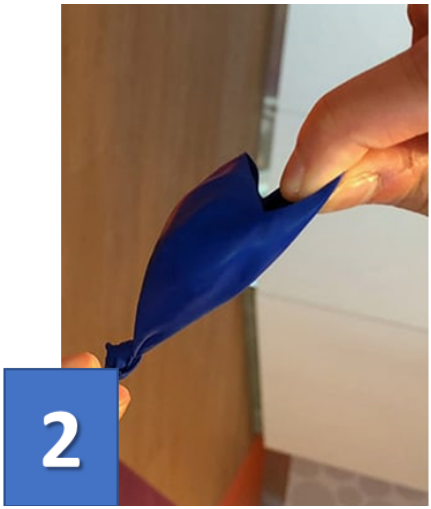
In this project, we're going to build our very own lung model and see how breathing works. Let's get started!

Instructions

Note: Adult assistance is required when handling the scissors in steps 1 and 2.

1. With an adult's help, use scissors to make a small hole in the bottom of a **plastic bottle or cup**. The hole should be big enough for a **straw** to fit through.

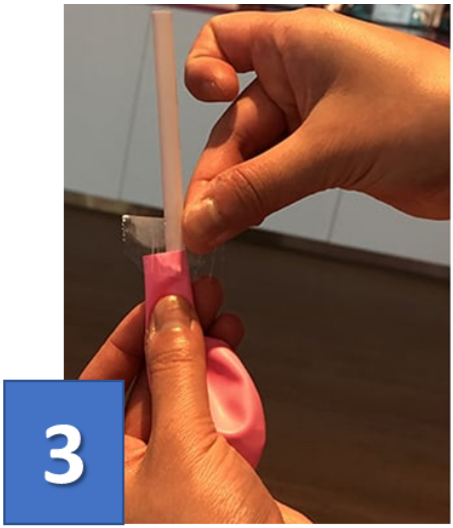
2. Tie a knot at the top of one **balloon**. Then, carefully cut off the big round part of the **balloon**. This **balloon** will stretch over the open top of the **bottle or cup**.

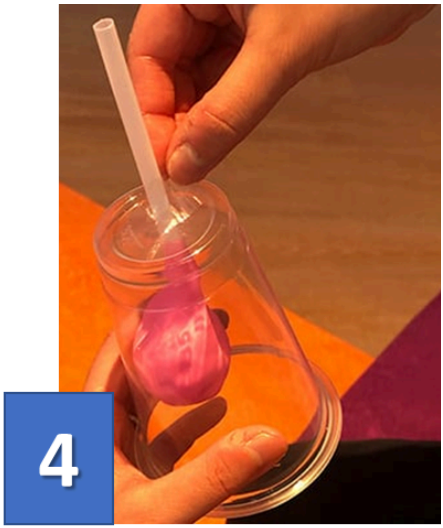


Instructions

3. Put a **straw** inside the second **balloon**. Use tape to seal it tightly so no air can escape.

4. Push the **straw** through the hole in the **bottle or cup**. Only a little bit of the **straw** should stick out. Tape around the hole to seal it.



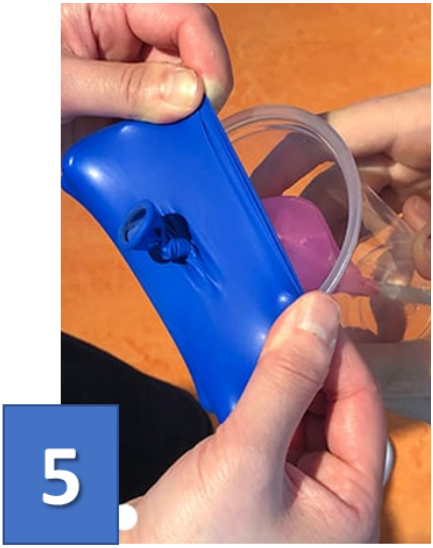


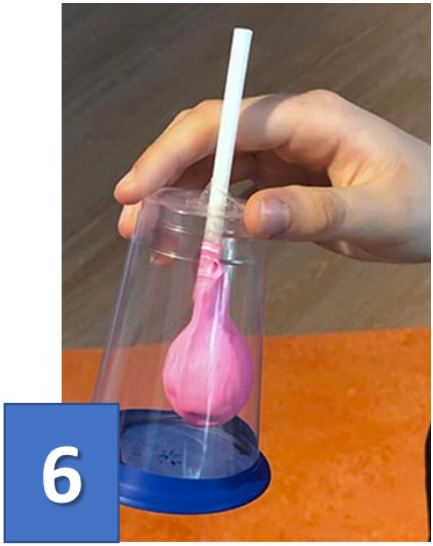
Instructions

5. Stretch the first balloon over the open top of the bottle or cup so it covers it completely. Tape it in place.

Now your lung model is ready!

6. Hold the bottle or cup. Gently pull the knot of the balloon at the bottom downward. Watch what happens to the balloon inside!





What's Happening?

- The straw is like the **tubes** that carry air to your **lungs**.
- The balloon inside is like a **lung**.
- The balloon on the bottom is like a **muscle** called the **diaphragm**.
- The bottle or cup is like your **rib cage** that protects your lungs.

When you pull the bottom balloon down, you make more space inside the bottle. Air goes down the straw and fills the inside balloon, making it bigger — just like a lung when you breathe in!

When you let go, the air goes back out and the balloon gets smaller — just like when you breathe out.

Try This!

We have **two lungs** in our bodies. Can you build a model with two balloons inside?

- What do you think will happen if one part is damaged?

(With adult help!) Try making a tiny hole in the bottom balloon. What happens when you try to "breathe" with your model?

Think About It

- Would you change anything to make your model better?
- Take a big breath in and out. What happens to your chest each time?
- Besides helping you breathe, what else does your breathing system do? (Hint: It helps you talk!)
- Can you name one or two sicknesses that make it hard to breathe, like asthma or a bad cold? How do they affect your breathing?

Submission Guidelines

Submit a clear photo of your lung model.

Include a short summary telling us:

- How your model works
- What you noticed when you pulled the balloon
- One interesting thing you learned
- The answer to at least one reflection question

The submission form is at the bottom of the following webpage: https://sciencechallenge.org.au/index.php/minor-challenges/

Note: If you want to include yourself in the pictures of your Minor Challenge, make sure you ask your parent or guardian first to see if it's okay.

Learn More! Resources

Learn more about our respiratory system - https://www.ducksters.com/science/breathing.php

You may also like to complete a quiz to test your knowledge on how breathing works through this link - https://www.ducksters.com/science/quiz/breathing_questions.php

Bibliography

- Breathing (no date) Breathing | Canadian Lung Association. Breathing | Canadian Lung Association: **https://www.lung.ca/lung-health/lung-info/breathing**
- Ellis, T., Schaefer Zarske, M. and Yowell, J. (2006) Creating model working lungs: Just breathe - activity, TeachEngineering. Engineering University of Colorado Boulder: **https://www.teachengineering.org/activities/view/cub_human_lesson09_activity1**
- Science at home: Build A lung model! (no date) Telethon Kids Institute. Telethon Kids Institute: **https://discoverycentre.telethonkids.org.au/activities/science-at-home-build-a-lung-model/**