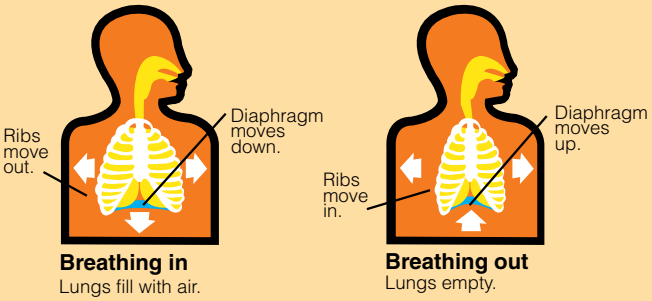
Lungs Expanding and Contracting

Activity

Equipment	Small plastic bottle, 2 round balloons, scissors.
Suggested class level	5th – 6th
Preparation	None
Background information	When you breathe in, a muscle under your chest, called your diaphragm, moves down and your ribs move out. This makes the space bigger and so you get lower air pressure in your lungs. Air now rushes in from outside. When you breathe out your diaphragm moves up and your ribs move back in, and the air gets pushed out.  **The model works in a similar way:** When you pull down on the rubber, the space inside the bottle gets bigger and the air spreads out. You now have lower pressure inside the bottle, so the higher pressure outside pushes air in; the balloon is blocking the way, so it takes in the air. (This is like breathing in). When you push in the rubber the opposite happens – the air inside the bottle gets squashed up (higher pressure now) and this higher pressure pushes air out of the balloon. (This is like breathing out).
Trigger questions	Why do you need to breathe? (To take in air) Why do you need to take in air? (So that your body gets oxygen) Why do you need oxygen? (Body cells – the tiny pieces that make up your body- use oxygen to release energy from food. Without oxygen they would die in a few minutes). What do you breathe out? (Carbon dioxide)
Cross-curricular links	SPHE
Skills	Experimenting Observing
Contents	Living things – myself Forces

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Activity

GOLD

Activities

Make a Model of Your Lungs

1. Push one balloon into the neck of the bottle, and fold the neck of it round the neck of the bottle.
2. Cut the entire neck off the other balloon, and dispose of the neck. Stretch the remaining piece of balloon, placing it over the open end of the bottle to form an air- tight join (seal if necessary with tape).
3. Pull on the middle of the piece of rubber. What happens to the balloon? (The balloon gets bigger).
4. Let go the piece of rubber, and then push it in gently. What happens to the balloon? (The balloon gets smaller).
5. Repeat stages 3 and 4:

this time breathe in while doing Stage 3 – can you feel your ribs move out as your lungs expand and your diaphragm moves down;

and breathe out while you do stage 4 – can you feel your ribs move back in as your lungs contract and your diaphragm moves up

Can you see that your diaphragm (the rubber) and lungs (balloon) behave in a similar way to the rubber and balloon?

Safety

Careful with hot water (for follow-up activity below)

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Follow-up activities

This is another activity which shows how air from the atmosphere goes into a space which has lower pressure).

Equipment: Glass bottle (empty wine bottle is a good size), balloon, scissors, hot water (not boiling), jug or tall bowl of cold water.

Method: Fill a glass bottle with warm water (careful – do not use boiling water or the glass may crack. Why? Because the inside of the bottle will expand before the outside and therefore burst open)

2. Leave it for a few minutes to warm the bottle.
3. Pour out the water.
4. Stretch the neck of the balloon over the top of the bottle.
5. Stand the bottle in a jug or bowl of cold water.
6. Wait a few minutes. What happens to the balloon?
   (The balloon gets pushed into the bottle.)

Explanation: When the air in the bottle is heated it expands, and some of it escapes. Then when the air that is left in the bottle cools down it contracts, so there is some empty space left (lower pressure), so more air from outside tries to get in; the balloon is in the way so it gets pushed in too!).