

What's my lung capacity?



do more
feel better
live longer

STEM at home

How does your lung capacity compare with somebody else's? We all have different lung capacities, and some people with conditions like **asthma** can have a lower capacity. Asthma medications work to help increase how much **oxygen** our lungs can take in. Measuring lung capacity is one way to confirm if medicines are having the desired effect.

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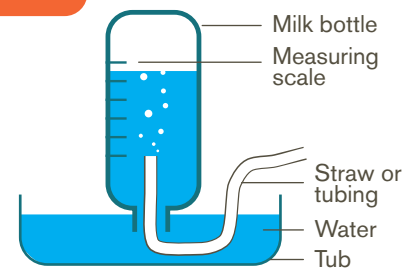
You will need

- An empty plastic milk bottle (six pints is best)
- A bendy straw (a short length of any tubing will work too)
- A large tub e.g. washing up bowl or storage container
- A measuring jug
- A waterproof marker pen



30 mins

Set up



Instructions

1. Measure out 250ml of water into the measuring jug
2. Transfer the water from the jug to the empty milk bottle. Mark off the height of water on the jug
3. Repeat the first two steps, marking off each 250ml increase. This will create a measuring scale on the side of your milk bottle
4. Completely fill the milk bottle to the top (even if your final 250ml scale mark is slightly below the top, add more water so it is full to the brim with water)
5. Fill the large tub with water, about a quarter of the way up
6. Hold your hand over the top of the full milk bottle to create a seal. Quickly turn it upside down and into the large water tub, ensuring no air bubbles have got in when you have placed the milk bottle upside down into the tub
7. Slightly lift the neck of the milk bottle away from the bottom of the tub (keeping the neck submerged in water). Insert the tubing or short part of the bendy straw into the neck of the bottle. One end of the tube/straw should now be inside the neck of the upside down bottle, which is full of water - the other is outside the tub away from any water
8. Take a deep breath and blow into the straw/tubing
9. As you breathe out, you will see water is displaced from the bottle into the tub. Use your scale to measure how much water you displaced. It might be helpful to have someone else read the scale while you're breathing out
10. Use a clean straw or tubing for someone else to have a go. How do your lung capacities compare?

What do you notice?

- Q. Were you surprised by how much water you were able to displace? If so, in what way?
- Q. How different were the lung capacities for different members of your household? What might cause this?
- Q. Did anyone manage to displace all the water? How could you amend the experiment to avoid this?

Take it further

Why does this method not give us a precise measurement of lung capacity? Hint: Did your 250cm³ marks go all the way to the top?

Try measuring your lung capacity using a balloon. Blow the balloon and release it a few times to stretch it out. Then take a deep breath and see how big you can get the balloon with one breath. Measure the diameter of the balloon to compare results.

The science in the real world

The amount of air we can fully exhale after taking a deep breath is called our vital lung capacity. It's amazing to physically see how huge this is. Everyone's vital lung capacity will be slightly different, depending on things like gender, age and fitness levels. Someone with a huge lung capacity will need a much bigger vessel – something like an empty water cooler. Some people have asthma, which reduces their vital lung capacity. This is because asthma can cause airways to become inflamed and narrow, stopping air from flowing so easily. Asthma relievers are medicines which relax the airways allowing air to pass easily again. They are often taken via an inhaler which helps deliver the medicine directly to your lungs.

