Lung Volume Lesson Plan

Amount of time Demo takes: 1-5 mins.
Don’t try this at home!

Materials
- Spirometer
- Mouth Pieces
- Rubber Gloves
- Alcohol sanitizer
- Whiteboard/Markers
- Lung model (not yet built)

Set-up Instructions
1. Lay out materials. Test the spirometer and markers.

SAFETY!
- Sanitizer - This demo involves children putting their mouths on our equipment. Please keep it very clean! You may elect to use gloves as well.

Lesson’s Big Idea
- Secondary School
  - Lungs are the main component of the pulmonary system - which is responsible for exchanging CO₂ for Oxygen in the blood.
  - Each person’s lungs have a given volume and the ability to use your lungs fully depends on physical health. We measure the volume of your lungs with a device called a spirometer.
  - When you take a breath, your rib cage expands and your diaphragm pulls downward, increasing the volume in the lungs and pulling air in. When the breath is released, the pressure inside the lungs and contracting rib cage force air out.
- Elementary School
  - When you take a big breath, all the air goes into your lungs. What does it do there? Tiny particles called molecules play a switching game. A gas called CO₂ (which plants breathe) goes out of your body and Oxygen goes in. You need lots of fresh oxygen, which is why you
can’t hold your breath for a long time. Let the oxygen in!
○ A spirometer measures how much air can fit in your lungs.
○ When you take a breath, your chest gets bigger to let all the air in.
    When you breathe out, your chest shrinks.

Instructional Procedure
  1. Prepare device (sanitize and put mouthpiece on).
  2. Invite the participant to take a big breath, like they’re going to dive underwater. Then they should blow into the spirometer until they have exhaled completely.
  3. The spirometer needle will spin to reflect the number of cubic centimetres of air the students’ lungs can hold. For example, if a student’s reading is 2,500 c³, they can imagine two and a half 2-liter pop bottles filled with air, that was inside their lungs.
  4. Record reading on whiteboard (you can host a friendly competition among students).
  5. Reset the device (turn top part back to ‘0’) and sanitize it.
  6. Talk with students about what a higher or lower lung capacity might mean. For example, swimmers tend to have very high lung capacity and people who smoke often have lower capacity.

Assessment/sample questions you can ask
  1. How do lungs work?
  2. What does a spirometer measure?
  3. Why is it important to keep lungs healthy?

Clean Up
  ● Sanitize device and erase dry board.
  ● Place clean, dry equipment back in the tote.

Next Generation Science Standards
  ● K-5
    ○ 1-LS3-1
  ● 6-8
    ○ MS-LS1-3
  ● 9-12
    ○ HS-LS1-3