



Curiosity Guide #505

Circulatory System

Accompanies Curious Crew, Season 5, Episode 5 (#505)

Design a Working Stethoscope

STEM Challenge

Description

Create two different working stethoscopes in a fun quest.

Materials

- Funnels of assorted sizes
- Plastic tubing
- Short garden hoses
- PVC pipes
- Paper towel tubes
- Plastic bottles
- Heavy paper
- Straws
- Tape
- Aluminum foil
- Plastic wrap
- Rubber bands
- Balloons
- Foam cups
- String
- Three-way connectors
- Rubbing alcohol
- Scissors
- Snips for cutting the thicker materials
- Materials cost sheet

Procedure

- 1) Work with the materials to design two stethoscope prototypes that can be used with one person listening to the heartbeat of another person.
- 2) Design your prototypes.
- 3) Determine the cost for each of the prototypes.
- 4) Build your stethoscopes.
- 5) Test to see which can amplify the human heart the best.
- 6) Redesign your prototypes to see if you can improve their effectiveness.
- 7) Keep a record of your original designs, the changes you made, and what happened after each change to the designs.
- 8) Which prototype was most effective? Which was most cost-effective?
- 9) How does your prototype compare to a commercial stethoscope?

IMPORTANT: If your prototype has parts that go in the ear, be sure that the device does not enter the ear canal and that the ends are sanitized with rubbing alcohol before another person tests the stethoscope.

My Results

Explanation

Stethoscopes are medical tools that doctors use to listen to their patients' hearts. The disc that is held against the patient is attached to tubing and ear pieces that the doctor can listen through.

Stethoscopes amplify the sounds the heart makes when it beats. The "lub dub" sound we hear is a vibration from the contracting heart, and that vibration moves through the stethoscope, which our ears detect as sound.

Think about this: First find a diagram or sketch of the parts of the heart. You can search your library in books or find some great graphics on the internet!

The heart has four chambers through which the blood moves. Blood comes from the body into the right atrium and then moves through the pulmonary valve into the right ventricle. From there, the blood passes through the pulmonary valve to travel to the lungs to get oxygen and get rid of carbon dioxide. Now on the other side of the heart, the blood returns from the lungs. The blood enters the left atrium and passes through another valve into the left ventricle. Finally, the blood is pushed through the aortic valve to carry oxygenated blood to the body. The walls of the left ventricle are much thicker than the right because the left ventricle has to push the blood throughout the body, so the muscle itself is stronger. Lub, Dub! Grab your stethoscope and have a listen!

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