DIY Stethoscope

“Take a deep breath and let it out.” Doctors say this when they are listening to your lungs and heart with their stethoscope. Explore how this simple device can be used to listen to someone’s heart and take their heart rate!

TEKS:
HEALTH 2.3 B: The student is expected to identify the major organs of the body such as the heart, lungs, and brain and describe their primary function.
HEALTH 2.3 C: The student is expected to identify the major systems of the body.
MATH 2.4 C: The student is expected to solve one-step and multi-step word problems involving addition and subtraction within 1,000 using a variety of strategies based on place value, including algorithms.
HEALTH 4.2 B: The student is expected to describe the basic function of major body systems such as the circulatory and digestive systems.
MATH 4.4 D: The student is expected to use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties.
SCI 7.12 B: The student is expected to identify the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, excretory, reproductive, integumentary, nervous, and endocrine systems.

Materials:
• Duct tape or other strong tape
• Plastic funnel (or sheet of cardstock, pencil, and scissors)
• Paper towel roll
• Timer or watch that measures seconds
How To:

1. If you do not have a plastic funnel at home, follow instructions a-f below to create a cone out of cardstock. If you do have a plastic funnel at home, skip to step 2.
   a. Draw a large circle on your piece of cardstock (tracing a bowl can help ensure the circle is round).
   b. Use scissors to cut out your circle.
   c. Draw two straight lines from the center point of the circle to create a triangle-shaped wedge in your circle. This wedge should take up approximately ¼ of the circle.
   d. Cut out the triangle wedge.
   e. Bring the cut sides of your circle together and overlap them. This will create a cone shape. Make sure the narrow end of the cone has an open hole at the end.
   f. Tape the cone together so that it keeps its shape. You are now ready to create your own stethoscope!

2. Place the narrow end of your plastic funnel or cone into the paper towel roll.
3. Tape the funnel (or cone) and paper towel roll together. Be sure that there are no gaps or spaces where you tape them together.
4. Your stethoscope is ready to use!
5. Try listening to someone’s heartbeat. First, put the cone/funnel on the left side of the person’s chest. This is where the heart is located! Make sure the cone/funnel is flat against their chest. Put your ear against the opening of the paper towel roll. You should be able to hear their heartbeat! If your surroundings are noisy or if the person is wearing thick clothing, it may be hard to hear the heartbeat, so you may need to make some adjustments.

6. Once you can hear someone’s heartbeat, try to determine their heart rate. A heart rate is the number of times your heart beats in one minute. When you listen to the heart, you will probably hear two sounds. These two sounds represent the closing of valves in the heart as it pumps blood. It should sound like lub-dub, lub-dub. When counting your heart rate, 1 beat = 1 lub-dub. The second sound (dub) is usually stronger, so you could listen only to that sound and tune out the first one (lub). To take someone’s heart rate, count the number of beats (lub-dubs) you hear in 10 seconds. Then, take that number and multiply by 6. That is a person’s heart rate in beats per minute (bpm)!

**STEM Explanation:**
Medical doctors use stethoscopes to listen to and measure a person’s heartbeat. It is important to hear a person’s heartbeat because it can tell us a lot about whether a person’s heart is normal or if something is wrong with it. The sound of the heart beating is actually the sound of blood pumping through the heart to get to other parts of our body. Normally, oxygen-deprived blood rushes into the heart from our arms, legs, brain, and other parts of the body called the systemic circuit. Next, the heart pumps that blood into our lungs so that oxygen can enter the blood. Once our blood picks up oxygen in the lungs, it goes back to the heart. Then, the heart pumps the oxygen-rich blood back out into the systemic circuit (to the legs, arms, brain, etc.). We need our heart to pump oxygen-rich blood out to all parts of our body because our body needs oxygen to function. We need oxygen in our muscles to move and oxygen in our brain to think!

**Career Connection:**
A medical doctor is a professional who practices medicine, which includes treating people who are ill from diseases, injuries, or other conditions. Doctors can choose from a variety of specialties, such as scientific research, internal medicine, surgery, and mental health. A doctor has to complete many years of school in order to practice medicine, including earning a bachelor’s degree and completing four years of medical school followed by 3-7 years of a residency program.

**Resource:**
https://www.sciencebuddies.org/stem-activities/make-stethoscope#materials