



Follow-up Activity: For Students

Anatomy/Physiology 15: Heart Dissection

Introduction:

In this week's lesson we learned all about the anatomy of the heart. Since doctors can't easily see inside you to examine your heart, they must use tools to help them test your heart. A doctor uses a stethoscope to listen to a patient's heart. In this activity, you will make two of your own homemade stethoscopes and determine which stethoscope design works best and why. You will then use your best stethoscope to determine your patient's heart rate.

Activity 1: Make and test your own stethoscope

"Lub-dub, lub-dub, lub-dub." That is the sound the doctor hears when he or she uses a **stethoscope** to listen to your heart. The doctor listens to make sure the heartbeat sounds normal and has a regular, steady rhythm. In this activity you will create your own working stethoscope.

Materials:

- Plastic kitchen funnels:
 - 2 large
 - 2 small (*Tip: inexpensive grocery store funnels often come in sets.*)
- A cardboard tube from a paper-towel roll
- Plastic tubing, at least as long as the cardboard tube; available at hardware stores and aquarium supply stores
- A pair of strong scissors or utility knife (with a parent's help) to cut your tubing
- Electrical tape or Duct tape
- A helper to be your patient

Procedure:

Make Stethoscope #1:

1. Make the first stethoscope with a large funnel, a small funnel, and the plastic tubing.
2. Cut the plastic tubing so that it is exactly as long as the cardboard tube. Have an adult help you cut the tubing.
3. Put a small funnel in one end of the tubing, and a large funnel in the other end. If it is hard to put the funnels in the tubing, soak the tubing in warm water to soften the plastic and try again. If this does not work, dry the tubes and use tape to secure the tubing to the funnels.



Make Stethoscope #2:

1. Make the second stethoscope with a large funnel, a small funnel, the cardboard tube, and duct tape.
2. Put a small funnel in one end of the cardboard tube and secure it with tape.
3. Put a large funnel in the other end and secure it with tape.



Test your Stethoscopes

1. Recruit a friend or adult to be your patient. Work in a quiet room or it will be difficult to hear.
2. Listen to the heartbeat of your patient using each one of your homemade stethoscopes.
3. Place the large funnel of the stethoscope on your patient's chest, over where his or her heart is.
4. Put the small funnel against your ear, covering it and listen for your patient's heartbeat.

5. Answer the following questions

Review Questions:

1. Which stethoscope made it easier for you to hear your patient's heartbeat?
2. Why do you think one of the stethoscope designs worked better than another design? How do you think the type of tubing used in the design might have made it work better?
3. If you have seen and felt a real doctor's stethoscope before, think about how the best homemade design you tested is different from a real stethoscope. What parts are different, and how are they different? How do you think the differences make the real stethoscope work better or make it easier to use all of the time?
4. **Optional:** Make one of the stethoscopes again but find something to change. For example, use longer or shorter tubing, or tubing of a different material or size, or a different size funnel. How does this change how well the stethoscope works? Did it make it better or worse?

Activity 2: Use your Stethoscope to calculate heart rate

Do you know what your heart rate is? Did you know that it changes throughout the day, depending on how much energy you're using? The more physically active you are, the more oxygen you need, which means your heart has to beat faster to move all the oxygenated blood around.

Materials:

- The best stethoscope you made in activity #1
- A watch or clock with a second hand

Procedure:

1. Use your best homemade stethoscope and measure your patient's heart rate. (The heart rate is the number of times the heart beats in one minute).
2. It is easy to measure heart rate: Listen to your patient's heart for 10 seconds.
3. Count the number of beats you hear in 10 seconds. Keep track with the second hand of a watch or clock.
4. Multiply the number of beats you counted by 6 to figure out the number of beats per minute. This is your patient's heart rate.

$$\text{heart rate} = (\# \text{ of pulse beats in 10 seconds}) \times 6$$

5. Have your patient run in place or do jumping jacks for 1 minute then re-calculate their heart rate using your stethoscope.

Review Questions:

1. How did the patient's heart rate change after doing the activity?
2. What types of activities might cause your patient's heart rate to decrease?
3. What time of day would you expect your heart rate to be the slowest?

Additional Resources:

- University of Michigan What is your Pulse Link and Video: <http://uofmhealthblogs.org/childrens/what-is-your-pulse/7159/>

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