



Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences –particularly students of color and girls – by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at [www.projectexploration.org/stemathome](http://www.projectexploration.org/stemathome).

## In this activity, you will:

learn about the function of the human heart and learn how to measure your heart rate.



## Supplies Required:

- Stopwatch
- 3 empty water or pop bottles
- 4 bendy straws
- 3c of water
- Food coloring
- Tape
- Modeling clay

## Video

Learn about the human heart: <https://tinyurl.com/yywz9eux>

## Overview

Your heart rate is how fast your heart beats. Heart rate is affected by many things, like activity, age, health, activity, caffeine, sugar and more. Want to measure your heart rate? Set the timer for one minute and do as many jumping jacks as you can. Once the timer goes off, reset it for one minute, and take your pulse. Count the number of beats you feel for one minute.

Our heart is made of four chambers—the right and left atrium, and the right and left ventricle. We have four heart valves. As blood moves through the heart, the valves help it to move in the correct direction, and through the chambers. Blood will flow in only one direction – into the heart, to the lungs to be oxygenated, back into the heart, then back out into the body. Watch carefully as you do the work of the valves as you pinch the straws. When you pinch the straw between the first two bottles, you are mimicking the Tricuspid or Mitral valves. When you pinch the second straw you are mimicking the Aortic or Pulmonary valves.

## Instructions

1. Make holes into two of the bottle caps. Save the third one as a backup. The holes should be big enough to fit the straws. If they are too big, use the clay to plug the gaps.
2. In a pitcher, mix your water and food colouring to create your "red blood". The exact amount of water is not important.
3. Take two straws, stretch and bend them to create a 90 degree angle. Slide one straw into the other straw (pinch one to make it smaller so it slides in), then tape up the join. Repeat with the second set of straws.
4. Place your three bottles on the table. Fill the first two with your water to about 80% full. Leave the third one empty.
5. On the first bottle place the cap with one straw hole and one small hole. On the middle bottle place the cap with two straw holes. Leave the third bottle without a cap.
6. Carefully slide the straws through the bottle caps. Place clay or playdough around the straw bases on the middle bottle to make an airtight seal with the bottle cap. You are now ready to put your heart model to work!
7. To make your heart model work, squeeze the middle bottle only. Start by pinching the straw between the atrium and ventricle bottle. Squeeze the middle bottle and watch your "blood" squirt out into the body.
8. Keeping the middle bottle "squeezed" move your fingers and pinch the straw between the ventricle and body. Now release the middle bottle and watch your blood move from the atrium into the ventricle.

## Additional Resources

1. How does the circulatory system work? <https://tinyurl.com/zzewxsd>
2. Read and learn more with Ducksters: <https://tinyurl.com/yy83sytb>

## Share It Out

**Share on social media:** Take a video of your model heart and explain the parts. Share your knowledge on social media using the hashtags:

#HumanHeart  
#ProjectExploration  
#StemAtHome

For more activities like this one, go to [www.projectexploration.org/stemhome](http://www.projectexploration.org/stemhome). If you're interested in learning more about Project Exploration and our free events, programs, and activities, please find us on social media and be sure to follow!



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