How Does the Heart Pump Blood?

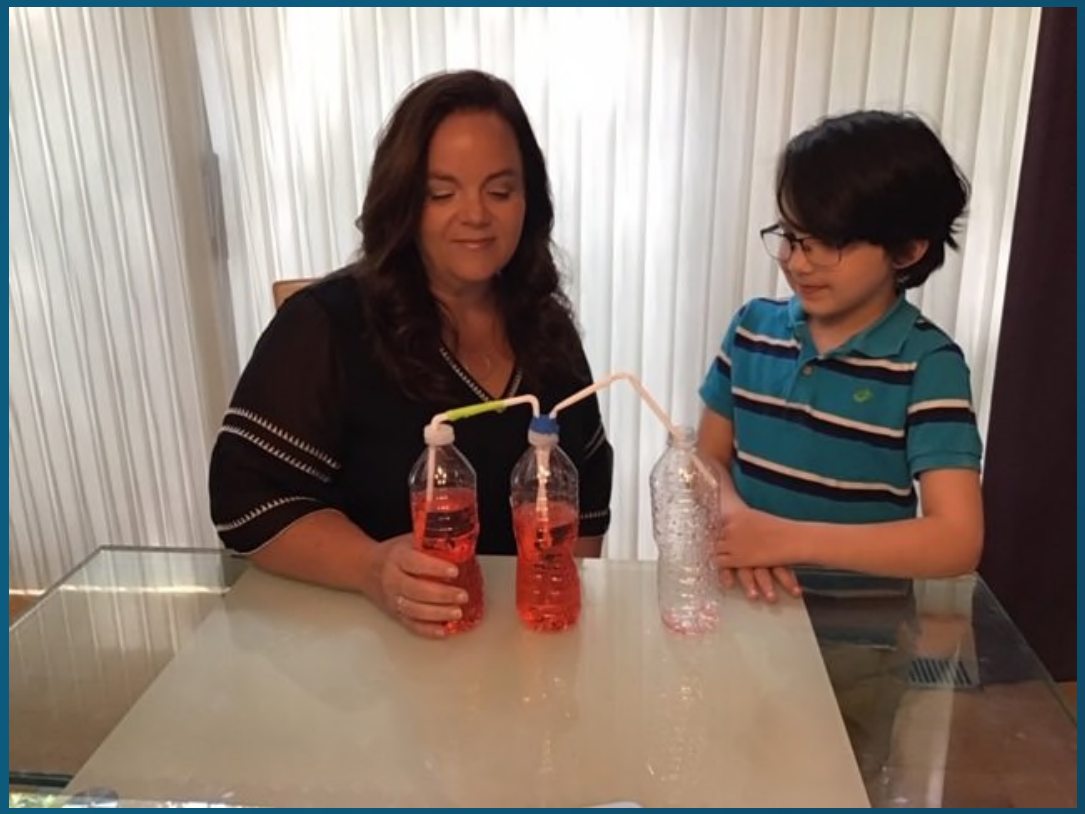
ACTIVITY

Did you know that a human heart beats around 100,000 times, circulating roughly 2,000 gallons of blood, all in one day? Learn more about this amazing organ and how it controls blood flow by creating your own heart pump model.

What you will need:

- 3 clear plastic 20oz bottles and 2 caps
- 4 flexible straws
- Modeling clay or putty
- Tape
- Permanent marker
- Red food coloring
- 3 cups water
- Drill (and a helpful adult)
- Safety glasses

Directions:



Directions:

1. Put on the safety glasses.
2. In the first bottle cap, drill two straw-sized holes. In the second cap, drill one straw-sized hole and a slightly smaller hole.
3. Bend two straws to form a 90-degree angle, slide one straw into the other and tape to secure. Repeat with the other two straws.
4. In a pitcher, add red food coloring to the water to create the “blood.”
5. With the permanent marker label the three bottles “atrium,” “ventricle,” and “body.” Label the two straw segments “tricuspid and mitral valves,” and “aortic and pulmonary valves.”

Directions:

6. Fill the “atrium” and “ventricle” bottles ¾ of the way with the “blood.” Leave the “body” bottle empty.
7. Place the cap with the different-sized holes on the “atrium” bottle and the cap with the same-sized holes on the “ventricle” bottle.
8. Slide the straws through the caps and create an airtight seal with modeling clay or putty, ensuring that the straws are well below the surface of the “blood.”
9. With the “ventricle” bottle in the middle, connect the “atrium” with the “tricuspid and mitral valves” straws and connect the “body” bottle with the “aortic and pulmonary valves” straws.

Directions:

10. While pinching the “tricuspid and mitral valves” straws, squeeze the “ventricle” bottle. This will force the “blood” into the “body” bottle.
11. Keeping the “ventricle” bottle squeezed, release the “tricuspid and mitral valves” straws and pinch the “ aortic and pulmonary valves” straws.
12. Slowly release the “ventricle” bottle and watch the “blood” move from the “atrium” bottle to the “ventricle” bottle.
13. Repeat to pump “blood” from the “atrium” to the “ventricle” and out to the “body.”

What Happened?

The human heart has four chambers (right and left atriums, and right and left ventricles) along with four valves (tricuspid, mitral, aortic, and pulmonary). Together, these eight structures ensure that blood flows in one direction. Blood in need of oxygen (deoxygenated) enters the right atrium, passes through the tricuspid valve to the right ventricle, then through the pulmonary valve to the pulmonary arteries.

What Happened?

The pulmonary arteries take blood to the lungs to pick up oxygen and the pulmonary veins take the freshly oxygenated blood back to the heart. The blood is pumped into the left atrium, through the mitral valve to the left ventricle, and finally out to the body through the aortic valve. Valves prevent blood from flowing back into the previous chamber. This remarkable design, along with blood pressure, keeps everything flowing in the right direction.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