



February 2013 – Cardiac Science

Cardiac means of or relating to the heart. February is American Heart Month, so in this issue, you'll learn more about your heart! Human hearts have four chambers and work as a pump delivering blood to your body. Using common household items, you'll make a pump that illustrates how your heart pumps blood to the rest of your body.

Heart Pump Project

Find out how the amazing muscles that make up your heart work to keep your blood pumping every day. Make a pump using a jar, a large balloon, and two straws to get an idea of how your heart pumps blood.

What you need:

- [beaker](#) or wide mouth jar
- large [balloon](#)**
- 2 [flexible drinking straws](#)
- wooden skewer
- scissors
- water
- tape
- large pan or sink

****Children under 8 can choke or suffocate on uninflated or broken balloons. Use adult supervision and keep uninflated balloons from children. Discard broken balloons at once.**

What you do:

1. Fill the jar half full of water.
2. Cut the neck of the balloon off at the part where it starts to widen into a balloon. Set the neck part aside.
3. Stretch the balloon over the opening of the jar, pulling it down as tightly as you can. The flatter you can get the surface of the balloon, the better.
4. Carefully use the tip of a skewer to poke two holes in the surface of the balloon. Make them about an inch apart from each other and near opposite edges of the jar.
5. Stick the long part of a straw into each hole. The straws should fit securely in the holes so no air can get through around the straws.



6. Slide the uncut end of the balloon neck onto one of the straws and tape it around the straw.
7. Set your pump in a large pan or the sink to catch the pumped water. Bend the straws downward. Gently press in the center of the stretched balloon and watch what happens to the water in the jar.

What happened:

You made a simple pump that moved water from the jar through the straws and into the pan. The cut end of the balloon worked as a valve to stop the water from going back down the straw. Your heart pumps blood out into your body through your arteries in a similar way.

Human hearts have four separate chambers inside. This pump shows how one chamber and its valve works. A valve is used to keep blood that has been pumped from one chamber to another from flowing back into the chamber it came from. Try taking the balloon valve off of the straw and pump water again. Did you notice anything different? You likely saw that water still came out of the straw, but without the valve, there was nothing to keep some water from going back down the straw. In order to keep blood moving through your heart and into your body, your heart needs valves to separate its chambers.

Original project found here (<http://www.smm.org/heart/lessons/lesson5a.htm>).

Fun Facts

- Your heart is in front of your left lung, protected by your rib cage.
- The study of things pertaining to the heart is called cardiology.
- Because your heart is a muscle, it needs exercise to stay strong!

Silly Science

- What's the most loving vegetable?
 - Artichokes, because they have hearts!
- **Patient:** Dr., I've noticed a second heartbeat since my surgery.
 - **Doctor:** So *that's* where my watch went!

Way Cool Websites

- Study how hearts beat and have attacks with this [interactive diagram](#).
 - Learn how to [keep your heart healthy](#) with three basic steps.
 - This helpful animation shows [how blood pumps](#) through your heart.
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Teaching Tips



Did you know that your heart is made up of muscles? Not just any muscles, though! The muscles that keep your heart pumping are called *cardiac muscles*. They are particularly strong and can work constantly without becoming tired or sore the way other muscles often do.

Cardiac muscles are involuntary muscles, which means that they work whether you think about it or not. Think about the muscles in your arm. If you want to pick something up, you have to use your muscles to move your arm. Those muscles are voluntary muscles because you can control them. The muscles that keep your heart pumping are involuntary because you cannot control them. It's a good thing, because if you forgot to tell your cardiac muscles to pump blood, even for a moment, it would cause a lot of problems for the rest of your body!

Human hearts have four chambers and work as a pump constantly delivering blood to the body. Deoxygenated blood—which needs a fresh supply of oxygen—is brought by veins in from the body into the first chamber, known as the right atrium. The heart then pumps the blood through the first valve and into the right ventricle. Then it is pumped through the next valve and off to the lungs through a large artery. In the lungs, the blood receives oxygen. From the lungs, the oxygenated blood is brought back to the heart. The blood passes through the left atrium through another valve and into the left ventricle; from there it is pumped through yet another valve into arteries to be taken to the rest of the body. This process of pumping blood through the body is called *circulation* and it repeats itself all day, every day throughout your life! Valves act like doors in your heart, controlling how much blood goes in and out. The "lub dub" beating sound your heart makes comes mostly from the valves opening and closing.

Can you think of any other examples of a pump? How about the pump on a soap bottle? A pump like that also has a valve inside that allows the soap to come out of the tip rather than sliding back down the tube.

How about other kinds of valves? A faucet has a valve that can close off to control how much or how little water comes out. When you turn the faucet's knobs, you control the valve. A sports drink bottle also has a valve that allows water out, but you can't pour water back in through it.

Click here to learn more about how your [heart](#) works.