mystery science

Grades K-5
Mini-Lesson + Activity: “How does your heart pump blood?”

VIDEO TRANSCRIPT

MINI-LESSON VIDEO 1

Hi, it's Doug! So, every Valentine's Day, you see a bunch of hearts that look like this. But it's funny, I have here a wooden model of a human heart—so this is the actual shape of the heart inside of our bodies. You see that? They don't look anything alike. Someone named Kayla has a question about hearts. Let's give her a call now.

[Video Call]

- Hi, Doug!

- Hi, Kayla!

- I have a question for you. How does your heart pump blood?

- That's a great question.

This is a picture of what a real human heart looks like. You probably know that the job of the heart is to pump blood through your body. It's one of the most important organs in your body. You couldn't live without it. It's so important that when you go for a checkup, what's the first thing the doctor does? They listen for the sound of your heartbeat to make sure that you're healthy. Listen to that. Did you ever think about why we call it a heartbeat? It's kind of like the rhythm in a song. It just keeps repeating, making the same sound over and over again. Thump, thump,

thump, thump. Why does it make a sound like that? Sure, you know it's pumping blood, but what exactly is going on that causes it to make that thump-thump sound?

MINI-LESSON VIDEO 2

Okay, you ready? Well, people have always known that the heart makes a sound, but it wasn't obvious what exactly the heart is doing when it makes that sound. That's because, while it's easy to hear the heart, it's not easy to see it. I mean, it's not like anyone has clear skin. But what if I told you that there's an animal that does? Check this out: this is called a glass frog. Now, its skin isn't made of glass, that's just its name. But the skin really is see-through, especially on the underside. Here's the underside. And look right there, you see that? That's the frog's heart beating. So this is what a heart looks like each time it beats. Thanks to modern technology, we now have imaging that lets us see our own hearts as they beat. This is an animation showing what your heart looks like inside your body. Do you notice now what the heartbeat is? With each beat, you can see the heart is giving a big squeeze, almost like if you squeeze your fist. When scientists first discovered this, it reminded them of other parts of the body that are good at squeezing, like your hands and your arms. The parts of the body that are good at squeezing are muscles. By looking at the actual heart, scientists figured out that, in fact, the heart is a muscle. But unlike the muscles you have in your arm, instead of squeezing to pick things up or hold things, the heart is a muscle that squeezes blood around your body. It's actually a lot like a squeeze toy, like when you're little and you play with a rubber duck in water. Think about it: when you squeeze a rubber duck, it squirts out water. And then, if you dunk it back into the water again and then you release it, it sucks water back in, right? Filling up again. And, now, it can squirt water again. Your heart is very similar to this. Just like a rubber duck is hollow and can be filled with water, your heart contains hollow parts on the inside that can be filled up with

blood. We saw that when a duck gets squeezed, it squirts out the water—it's the same with the heart. When your heart beats and squeezes, it pushes out blood. Now, as you might guess, when the heart squeezes, it doesn't just send blood squirting all over the place like this. Blood leaves the heart in tubes. They're what we call blood vessels. There are also blood vessels that bring blood into the heart to refill it. When the heart stops squeezing, it pulls blood in from those tubes, just like the rubber duck filled back up with water when you stopped squeezing it. Those blood vessels then go to all the different parts of the body that need blood. You've probably noticed before that you can even see some of the blood vessels in your own body, like if you look at the inside of your wrist or elbow. Each time the heart pushes blood through the blood vessels, that gives a little push on the vessel. That's called a pulse. You can actually feel blood moving through the vessels if you put your fingers on your wrist. There are blood vessels inside your wrist, so when you feel your pulse there, what you're really feeling is the push from your heart squeezing the blood into the blood vessels. That's what a doctor is feeling when they're checking your pulse. If a doctor wants to find out how fast your heart is beating, she doesn't have to look at your heart, like in a glass frog. Instead, she can just feel for your pulse. Each push of the blood is actually the beat of your heart. So, in summary, the heart is a muscle that pumps blood to all the parts of your body by squeezing blood into tubes called blood vessels. As the blood goes through all the vessels in your body, it pushes on them —that's your pulse. That's all for this week's question. Thanks, Kayla, for asking it. Now, after this video is done playing, my friends and I here at Mystery Science have created a step by step activity that combines science with art. I hope you'll try it. Have fun, and stay curious!

ACTIVITY INTRODUCTION VIDEO

In today's activity, you're going to make a Valentine's card to your heart, the hardest-working muscle in your body. Before you make a Valentine, though, you're going to get to know your heart a little better. You'll listen to a heart beating, feel the rhythm or your own pulse, and make a paper heart that's the size of your own heart. I'll show you how to get started, step by step.

ACTIVITY STEP 1

Get your supplies. When you're done with this step, click the arrow on the right.

ACTIVITY STEP 2

How big do you think your heart is? My friend Pat will show you. Make a fist and put it on your chest where your heart is. There you go. Your heart is about the size of your fist. Now, put your fist on the gray parts of the Heart Sheet, like this. Each of the hearts on the Heart Sheet is a different size. Find the heart that best matches the size of your fist.

ACTIVITY STEP 3

Cut out the heart that matches your fist. Then, crumple the rest of the paper into a ball, like this. Don't throw it away; you're going to need it later.

ACTIVITY STEP 4

Predict: How many times do you think a heart beats in 30 seconds?

ACTIVITY STEP 5

Soon, you'll find out how fast a heart beats in 30 seconds. But first, let's practice counting five heartbeats. Put your hand over your heart, like Pat's doing here. I'm going to play a recording of a heart beating. You'll hear a heartbeat, a thump-thump sound, each time the heart squeezes. That's one heartbeat. Each time the heart squeezes on the screen, tap your chest and count to yourself. Let's try counting five heartbeats. We'll start on the count of three. Are you ready? Okay, one, two, three, go. Okay, go to the next slide to find out how many times the heart beats in 30 seconds.

ACTIVITY STEP 6

Now you're ready to find out how many times a heart beats in 30 seconds. It's harder than you might think. When I say go, start counting beats. When you see a stop sign, then stop counting. Are you ready? On your mark, get set, go. Okay, stop counting. Good job. Go to the next slide.

ACTIVITY STEP 7

Discuss this question.

ACTIVITY STEP 8

It's time to try to feel your pulse. Let's practice—hold one hand out like this. Then, wrap your other hand behind it and press your fingers here on your wrist, on the side that your thumb is on, like this. Once your fingers are there, close your eyes and keep very quiet, so you can concentrate. Don't move your fingers for at least 10 seconds. It can be hard to feel. If you can't feel your pulse and you need more tips, we'll show you on the next slide.

ACTIVITY STEP 9

Okay, if you couldn't feel your pulse, try these tips. If you were able to find your pulse, then help a friend.

ACTIVITY STEP 10

Okay, it's time to count how many times your pulse beats in 30 seconds. Now, the timer below will restart every 30 seconds. If you can't feel your pulse, you can count with a partner. Remember, every time you feel a pulse, that's from your heart beating and pushing blood through your blood vessels. Okay, wait until the timer gets to 30 again and you can start.

ACTIVITY STEP 11

Write the number of beats on your valentine. With each beat, your heart squeezes hard, pumping blood to keep you going.

ACTIVITY STEP 12

Let's get a feel for how hard your heart is working all the time. Grab that ball of paper that you crumpled earlier. Hold the ball of paper in your hand. Each time the heart beats on the screen, I want you to squeeze the paper as hard as you can. When you see a stop sign, that means one minute is up, then you'll stop squeezing. Are you ready? All right, get set, go. Okay stop. One minute is up. Go to the next slide to discuss.

ACTIVITY STEP 13

Discuss these questions.

ACTIVITY STEP 14

Color in the heart that's just your size to start making a Valentine's card to your heart. Just take about one minute to color. If you don't finish, that's okay, you can always do more coloring later. I'll start the timer now and I'll tell you when a minute is up. Okay, stop for now. You can always do more coloring later. Go ahead and go to the next slide.

ACTIVITY STEP 15

Check that you have the right Valentine's sheet for your grade level. Then glue the heart that you started coloring in place on the gray rectangle.

ACTIVITY STEP 16

Younger grades: trace the letters on your Valentine's card and write your name, like this. Older grades: fold your Valentine's cards, then fill in the front page and the back page. We'll finish the center pages in the next step. Younger grades: this is the last step you need to do, you're done.

ACTIVITY STEP 17

Older grades: discuss these questions. Younger grades: you're all done!

ACTIVITY STEP 18

Try your experiment. Take your pulse for 30 seconds using the timer. The timer will restart every 30 seconds. Afterward, write your results in your Valentine's card. Then your Valentine's card is done. Have fun and stay curious!