# Thistle Page 14

Greetings Thistles! We hope you are well and continuing to make good use of your time at home. Some of you will now be back in school and enjoying the fantastic activities planned for you. It has been a long lockdown, but shops and attractions are slowly beginning to open up. We hope that you have been able to enjoy the easing of lockdown, while staying safe. If you can, send us some photos of all the lovely things you have been doing. To fit in with our topic of Blood Heart, we have found the exciting activity below, but for safety, this must be done with an adult. Let us know if it worked and send some photos of your model if you can.

With love from Mrs Seville and Mrs Mackey.

With the help of an adult, you might like to have a try at making this model.

# ENGINEER A WORKING HEART MODEL



To build our heart model we used:
3 x Pop bottles (710 mL) with caps, labels removed.
4 x Bendy straws
3 Cups of water
Food colouring
Tape
Modeling clay or play dough
Drill (or other sharp pokey for making holes in the caps) ** Help from an adult**

# DIRECTIONS FOR HEART MODEL

You will need 2 bottle caps for this experiment. Keep the third one as a back-up. In the first cap drill two holes that are the same size. You want the holes to be just big enough for the straws to slide through. In the second cap drill one hole that is straw sized. The second should be smaller. If you drill both straw sized (like we did), you can use some modeling clay to make the second hole a little smaller.

In a pitcher, mix your water and food colouring to create your "red blood". The exact amount of water is not important.

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.

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Place your three bottles on the table. Fill the first two with your water to about 80% full. Leave the third one empty.

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.

Carefully slide the straws through the bottle caps. Place clay or play dough 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!

# MAKING YOUR HEART MODEL WORK

In this simple model the first bottle is the atrium of the heart, the second bottle is the ventricle, and the third bottle represents either the lungs or body. Our fingers function as the valves of the heart.

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.



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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.

Repeat, repeat, repeat to pump blood from the atrium, into the ventricle then out to the body!

Once your blood in the atrium gets too low, you can take blood from the "body" and add it back into the atrium. Then start again.

# EXPLORING THE SCIENCE

Your heart rate is how fast your heart beats. We measure this as beats per minute. The easiest way to do this is to count how many times your heart beats in ten seconds, then multiply the number by 6 (60 seconds in a minute) to get your heart rate.

Heart rate is affected by many things. It varies by person, but also each person experiences variations in their heart rate every day. Many things can affect heart rate including age, health, activity, caffeine, sugar and more.

In our heart model we are exploring how blood flows in one direction through the heart chambers. We have four chambers in our heart, the right and left atrium, and right and left ventricle. 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. The four valves of our heart are important for ensuring this one way blood flow. Watch carefully as you do the work of the valves as you pinch the straws. What happens to the liquid in the straws?

We have 4 heart valves. The Tricuspid and Mitral are located between the atrium and ventricle. The Aortic and Pulmonary valves control blood flow out of the ventricles into the arteries. When you pinch the straw between the first two bottles, you are mimicking the Tricupsid or Mitral valves. When you pinch the second straw you are mimicking the Aortic or Pulmonary valves.

Let us know how you get on. Was the model successful? Send us a photo to add to the gallery.