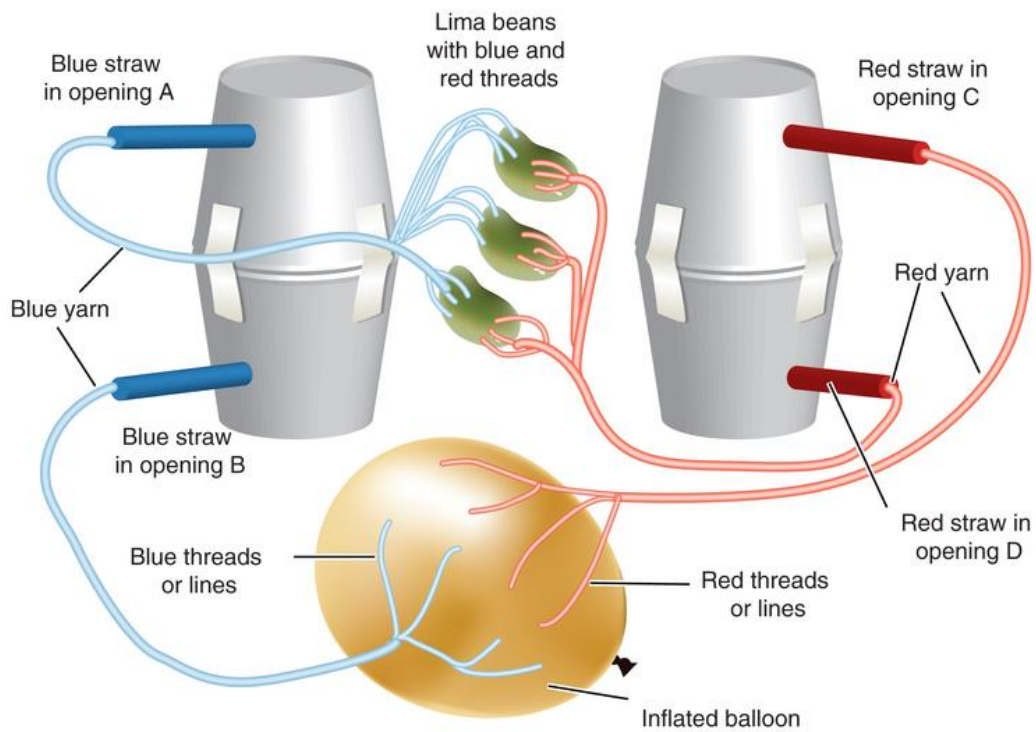


Inquiry Question

How can we build a model to better visualize how our circulatory system works?

Name: _____ **Date:** _____



Although your circulatory system is literally central to your existence at every moment of every day, it's a difficult system to visualize.

There are a LOT of parts to the circulatory and they exist throughout your entire body.

A good way to visualize a complicated system like this is to build a model.

In this project, you'll be building a model of the circulatory system, labelling it, explaining it, and taking pictures and/or video.

General Instructions

The end goal is to have a model that you've documented and can fully explain. Thus, make sure you have a plan prior to building. Will you be taking photos or video? Will you be including labels in the pictures or adding that later? Check with your teacher to confirm your plan.

Materials you'll need:

- Paper cups (4)
- Straw
- Glue
- Paper towels
- Colored pencils, pens, or paint (blue and red)
- Tape
- Balloon (white)
- Colored thread (blue and red)
- Colored yarn (blue and red, 2 pieces 20cm each)
- Lima beans (3 or 4)
- Scissors
- Ruler

Hints and Ideas:

- There are various ways to make a model of the circulatory system. You are welcome to deviate from the plan provided.
- Take pictures or video of you with your model showing how it's made and how it works.
- In your report/video, ensure you cover the following points:
 - what's the difference between veins and arteries?
 - name the "rooms" in your heart
 - explain the different blood colors
 - how is the blood pushed around?

Project submission:

You can either submit photos/video of your project (along with an explanation and/or steps of construction) or if you can drop-in to the school, you can present it to your teacher in-person.

The Build!

Use a pencil to carefully make a hole in each cup. You will place straws in the holes in the heart model. The straws will represent blood vessels.

Step 1 Place the open ends of two paper cups together. Secure the cups together with tape. Do the same thing with the other two cups.

Step 2 Stand the two sets of cups side by side. Each cup represents a heart chamber.

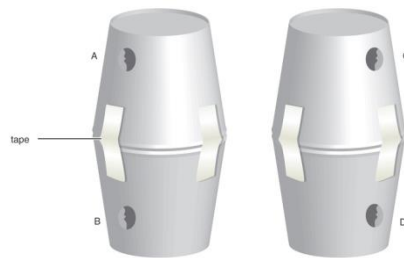


Figure 1.2

Step 3 Carefully poke a hole in the side of each cup as shown in **Figure 1.2** above.

Step 4 Cut a straw into four equal pieces. Color or paint two of the pieces blue and the other two pieces red, (You'll find out what the colors mean later.)

Step 5 Insert and glue one of the blue straws into opening B. Insert and glue a red straw into opening C.

Step 6 Stick a piece of blue yarn into the open end of the blue straw attached to the cups. Stick a piece of red yarn into the open end of the red straw attached to the cups. The straws and yarn represent **blood vessels** coming to and leaving the **heart**

Now you have two halves of what will be your model of the **heart**. The straws and yarn represent the system of **blood vessels** through which the **heart** pumps **blood**. Remember that this model resembles a figure eight rather than a simple circle. Half of the figure eight is the lung circuit where **blood** picks up **oxygen**. The other half of the figure eight is the body circuit where **blood** gives **oxygen** to all the cells of the body. Now you know the significance of the blue and red colors. Blue represents vessels carrying **blood** after it gives **oxygen** to cells. Red represents vessels carrying **blood** with a full load of **oxygen**. You can use this information in completing the following steps to finish your model.

Step 7 Inflate a white balloon to about 10cm (4 inches) in diameter and tie it off. The balloon represents the **lungs**.

Step 8 Glue blue and red threads on the surface of the inflated balloon, or use pens to draw blue and red lines. The threads (or colored lines) represent the tiniest **blood vessels** where the **blood** picks up **oxygen** from the air in the **lungs**.

Step 9 Glue the free ends of the blue yarn to the surface of the balloon that has the tiny blue vessels. Glue the free ends of the red yarn to the surface of the balloon that has the tiny red vessels. You have completed the part of the model that represents the pump that moves **blood to your lungs and back to the heart**. This part of your completed model should look like the one in **Figure 1.3**.

Step 10 Now finish your two-pump model of the **heart** by making a model of the pump that moves the **blood** to your body **cells**. Insert and glue the other red straw into opening D. Insert and glue the other blue straw into opening A.

Step 11 Stick a piece of red yarn into the open end of the second red straw. Stick a piece of blue yarn into the open end of the second blue straw.

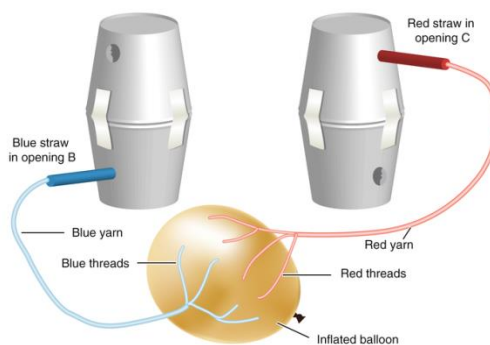


Figure 1.3 This is how the two halves of your model heart should look.

Step 12 Obtain three or four lima beans to represent **body cells**. Cut about 10 to 12 pieces of thread, each about 3 centimeters long. Half of the pieces should be red. The other half should be blue. Glue one end of several red and blue threads on the surface of each bean.

Step 13 Attach the free end of the red threads to the red yarn. Attach the free ends of the blue threads to the blue yarn. Your completed model should look like the one on the first page.

Step 14 Be sure you can explain to someone the path that a drop of **blood** would take in flowing through your model. Then write an explanation of how the blood would flow through your model.