

Analyzing the Siphon-Pump Heart Model

Directions: Write down the purpose ***and*** answer any questions in this inquiry.

Purpose:

Describe how blood circulates through the body.

Background Information:

Read “Dr. Harvey Closes the Loop” then answer the following question.

What did Dr. William Harvey mean when he said that blood recirculates around in our bodies?

Procedures

1. Use one siphon-pump and one cup of water to explore how the pump works (see picture). Make sure the ends of both tubes remain in or pointed toward the water in the cup.
2. Discuss the following questions with your group and record your answers in your science notebook.
 - A. What makes the water begin to flow through the pump?
 - B. Through which tube, the straight one or the flexible one, does water enter the pump?
 - C. What keeps the water from flowing back through the tube when you release the bulb (blue part)?
 - D. Listen closely as you squeeze the bulb. Can you hear any clicking sounds? If so, what seems to be causing them?
3. Now work with your group to create a “closed” circulatory system. Use both pumps and containers of water to create your system. You must connect the parts so that water flows continuously through the model. You also must work within two rules:
 - (1) You cannot add water to the cups
 - (2) Approximately the same amount of water must remain in each cup at all times.
4. When you have a model that you think works correctly, show it to your teacher. Your teacher will then give you a Model Circulation picture. (one sheet per group member AND one envelop per group).
5. Empty the envelope (should be 9 pieces), using the words and descriptions, correctly write (in pencil) the names of the parts of the heart on Figure A. Use the numbered picture to help you choose the correct location of each of the parts of the heart (circulatory folder titled 14.1 diagram).
6. Compare Figure A and Figure B. Notice how the upside-down siphon-pump system, which includes the cups and water, actually models the human circulatory system. As you refer to the two figures, do the following:
7. Write in the names of the parts of the heart on ONLY figure B. Check with the teacher when you think you have the correct answers.



9. Answer the following questions in your science notebook:

(A)(a) When you are operating your model heart, you should be able to hear the familiar “lub-dub” sound as well as see what causes it. Explain what causes the sound.

(A)(b) Why is the heart considered a double pump?

(A)(c) What is the function of the valves in the heart?

(A)(d) What do we mean when we say humans have a “closed” circulatory system?

10. Return, clean and dry all materials to your lab station. Your lab station should be dry when you leave class.

MARCELLO MALPIGHI— MAN WITH A MICROSCOPE

Microscopes had not yet been invented during the lifetime of William Harvey. But fewer than 50 years later, when the Italian physician Marcello Malpighi was beginning his career, this wonderful new scientific tool was available for use in research. Malpighi studied many human tissues under a microscope. He studied the liver, kidneys, skin, and even the brain. Malpighi was also interested in the circulatory system. In 1661, he described the network of capillaries that connect the arteries with the veins. This discovery completed the earlier work of William Harvey.



Dr. William Harvey

10. Read about Pepi and Bollo’s journey through the circulatory system in “Spies -Back in Circulation”

Conclusion:

Write in your spiral write how blood circulates through the body. Use the names of the parts of the heart in your writing.