



Lesson 3: The Heart Has Needs, Too!

Purpose

- ♥ Identify the main arteries and chambers of the heart
- ♥ Demonstrate blood flow through the heart
- ♥ Summarize the process of coronary artery blockage
- ♥ Analyze angiograms and identify areas of arterial blockage
- ♥ Predict the consequences of a blocked artery

Time Frame

45–50 minutes

What Students Do In This Activity

Students will review the parts of the heart and trace the flow of blood through the heart. They will learn the function of the coronary arteries, as well as what happens when these arteries become blocked. Students will look at angiograms to determine the amount of blockage Mr. Harvey has in his coronary artery.

Background

In this lesson, students study the anatomy of the heart by using a diagnostic tool called angiography, a special type of X-ray that shows the arteries of the heart. Angiography involves inserting a catheter, or flexible tube, into a large artery in the patient's leg and threading it up to the aorta. A special fluid called contrast dye is injected into the aorta, and then the X-ray machine captures pictures (angiograms) of the dye in the arteries. By examining the pictures, a cardiologist can tell if there is a blockage in any of the arteries that supply the heart with blood.

In a person with coronary artery disease, the arteries become clogged with plaque, which consists of deposits of cells, fats and cholesterol. If plaque buildup becomes severe, blood flow to the heart is compromised and the heart may become permanently damaged.

Materials

- ♥ Student pages for Lesson 3
- ♥ Angiogram transparencies for patients A, B, C and Mr. Harvey (5 of each included)
- ♥ Transparency of leg muscle and heart muscle
- ♥ Transparency of labeled heart with arteries
- ♥ Transparency of blocked arteries

Notes:

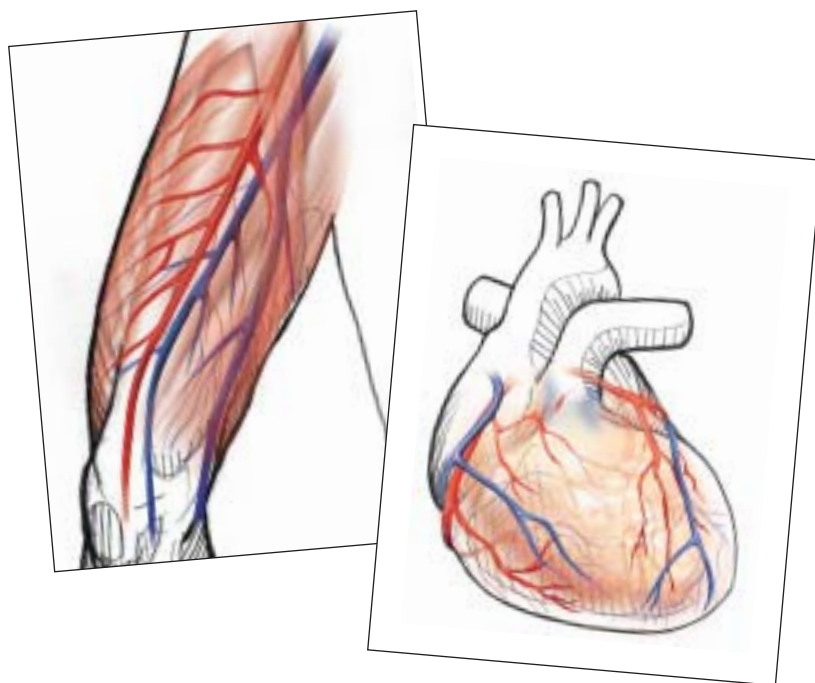


Procedure

As students follow along on their worksheets using blue and red colored pencils, use transparency of labeled heart to review the path of blood flow through the heart. *Note: Remind students that right and left will be on opposite sides than they are used to.*

Place the transparency of the leg and heart muscle on the overhead projector. To review the main function of the circulatory system, have the students look at the arteries that surround the leg muscle and ask them:

- 1. What does the leg muscle need in order to do its job?**
Oxygen, food and nutrients are necessary. Waste and carbon dioxide must be carried away.
- 2. How does the leg muscle receive the oxygen and nutrients it needs and get rid of the wastes it does not need?**
The blood travels from the heart and through the arteries to bring oxygen and nutrients to the muscle. The veins then carry waste, including carbon dioxide, away from the muscle and back to the heart.
- 3. Why do you think the heart needs more arteries than a leg muscle?**
The heart is a muscle that requires a *constant* flow of blood in order to do its job of pumping.
- 4. What is the job of the coronary arteries?**
The coronary arteries provide the heart with the oxygen and nutrients necessary to do its job.



Notes:

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Part C: What Is Heart Disease, and Why Is It Harmful? (10 min.)

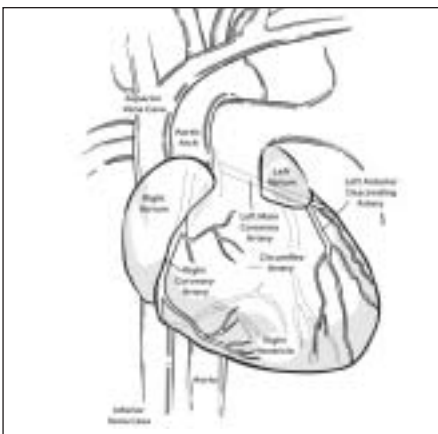
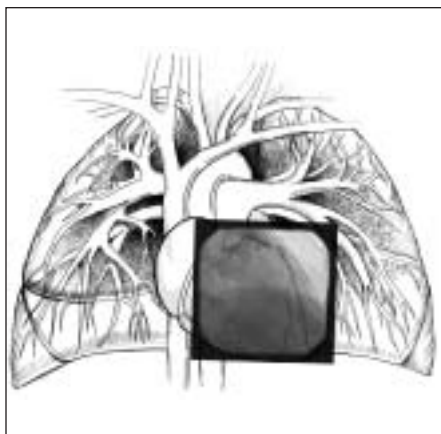
Students will learn about blockages and blood flow through the arteries. They will look at arteries with no blockage, 40 percent blockage and 95 percent blockage. They will then answer the following questions on their activity sheets:

- How can you tell if the arteries are blocked?**
Look inside the body, perform tests, take an X-ray, check blood pressure, if patient has symptoms like chest pain and shortness of breath.
- What are some ways that doctors can look inside the body to see if the arteries are blocked?**
They can use a special type of X-ray called angiography, which takes pictures of the arteries of the heart.



Part D: Diagnosing Heart Disease (10 min.)

- Students will read about angiography, a special type of X-ray cardiologists use to take a close look at the arteries of the heart.
- Students will look at an angiogram layered over a diagram of the heart and shade the area of the heart that would receive less blood if there were a blockage in one of the left coronary arteries.



Notes:



As they complete the worksheets, give each group of students the transparency of Bill Harvey's angiogram, as well as the angiograms for patients A, B and C. Students will try to interpret Mr. Harvey's angiogram to determine the percentage of blockage in his artery, and then answer questions to prepare for a meeting with Mr. Harvey.



Mr. Harvey's Angiogram

Patient	Blockage	Artery Affected	Condition	Treatment
A	None	None	Patient is healthy	None needed
B	40%	Left main coronary artery	Patient is developing coronary artery disease	Lifestyle change and medication
C	95%	Left main coronary artery	Patient has coronary artery disease	Invasive treatment
Mr. Harvey	95%	Left main coronary artery	Patient has coronary artery disease	Invasive treatment

Students should determine that Mr. Harvey has 95 percent blockage in one of his left coronary arteries, and that if this artery were 100 percent blocked, the left side of his heart would be damaged.

Notes: