

# Bay Area Scientists in Schools Presentation Plan

**Lesson Name** Cardiovascular System

**Presenter(s)** Jessica Pan, Aneesh Chandramouli, Daniel Hou

**Grade Level** 5th

## CA Science Standards Connections: 5<sup>th</sup> Grade, Life Science

**5-LS-2.** Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:

- a. Students know many multicellular organisms have specialized structures to support the transport of materials.
- b. Students know how blood circulates through the heart chambers, lungs, and body and how carbon dioxide (CO<sub>2</sub>) and oxygen (O<sub>2</sub>) are exchanged in the lungs and tissues.
- g. Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO<sub>2</sub>) and water (respiration).

## Next Generation Science Standards Connections: 4<sup>th</sup> Grade, Life Science

**4-LS1-1.** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Developing and Using Models</b> Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.</p> <p>Develop a model to describe phenomena. (4-PS4-2) Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2)</p>	<p><b>LS1.A: Structure and Function</b> Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)</p>	<p><b>Systems and System Models</b> A system can be described in terms of its components and their interactions. (5-LS2-1)</p>

## Common Core Standards:

*ELA/Literacy:*

**W.4.8** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

*Mathematics:*

**MP.2** Reason abstractly and quantitatively.



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## FOSS Connections:

3<sup>rd</sup> Grade Module: *Structures of Life*  
Investigation 4: *Human Body*

5<sup>th</sup> Grade Module: *Living Systems*  
Investigation 3: *Transport Systems*

## Teaser:

*Hello everyone, we are here today to teach you about the cardiovascular system, which is also known as the heart! Can anyone tell me what a heart looks like (have kids draw what they think heart looks like on paper)? Good! (Take out jar and show wet spec) This is actually what your heart looks like inside of your body! Isn't that amazing? Can anyone tell me why we need a heart? Why is it so important?*

**Objective:** *As a result of your lesson, what will students learn? What will they be able to do?*

Students will understand the basics of the cardiovascular system. We also plan on introducing blood and how it circulates oxygen throughout your body. We will also teach them concepts of vein and arteries. We will bring a stethoscope and teach them how to feel their pulse. Students will learn about the right and left side of their heart and their respective functions (pumping blood to the lungs and to the rest of the body, respectively). At the very end, we will show them how to maintain a healthy heart through various ways.

## Vocabulary/Definitions:

*Artery - Carries blood out of your heart and circulates throughout your body*

*Vein - Return blood to your heart to get oxygenated*

*Atria - chambers where blood enters before it enters ventricles*

*Ventricle - Chambers where blood is pumped into different circulation systems*

*Oxygen - a gas that you breathe in which go to all parts of your body; you need oxygen to survive and keep your heart pumping*

## Materials:

### What will you bring with you?

- Stethoscope (number of students / 2)
- Heart model - to show chambers
- Heart wet specs (3) + possibly 1 animal heart wet spec (sheep or calf)
- 2 posters
- sterile gloves (latex + non latex)



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- dissection trays, probes
- Print pictures of clogged arteries vs. normal healthy arteries
- Occluded Artery model

**What should students have ready (pencils, paper, scissors)?**

- *Paper & Pencil*
- *Blue & Red Crayons/ colored pencils / markers*
- *Have them wear nametags*

**Classroom Set-up:**

- **Projector, if possible (for PowerPoint presentation)**
- **Students should be split into 3 groups.**
- **Tables/desks arranged into 3 groups for 3 stations during the hands-on portion of the lesson.**

## **Classroom Visit**

**1. Personal Introduction: \_\_\_\_\_5\_\_\_\_\_ Minutes**

*Who are you? What do you want to share with students and why? How will you connect this with students' interests and experiences?*

Hello everyone! We are UC Berkeley college students who are very interested in the sciences and we hope to share our passion with you guys! We are students like you, always learning new things, except that instead of being in the fifth grade, we are in the fifteenth grade! We are going to start off with some introductions. My name is Daniel I hope to become a dentist one day! My name is Jessica and I'm currently studying biology with the goal of being a doctor one day! Hi my name is Aneesh and I also study biology and I want to become a doctor. We all want to help people take care of their bodies. Today we'll be teaching you about your heart and ways you can keep your heart healthy.

**Topic Introduction: \_\_\_\_\_15\_\_\_\_\_ Minutes**

*What questions will you ask to learn from students? Big Idea(s), vocabulary, assessing prior knowledge...*

Can anyone tell me what a heart looks like? (make them draw a heart on their paper). How big do you think your heart is? If you hold up your fist, it is roughly bigger than that! Well this is not quite what a heart looks like! In fact (take jar



out) this is what it looks like! Can anyone tell me what the function of the heart is? That's right, it pumps blood throughout your entire body. Why is blood important? It helps oxygenate every tissue; for example your organs and your muscles. A powerpoint will be used during this section

**2. Learning Experience(s): \_\_\_\_\_25\_\_ Minutes**

*What will you do, what will kids do? Demonstrations, hands-on activities, images, games, discussion, writing, measuring... Describe in order, including instructions to kids.*

**Before splitting kids into 3 groups, introduce blood flow and oxygen.  
Powerpoint slides.**

**Station 1: Aneesh**

Touching/seeing wet specs: emphasize what the heart is actually like; this same heart is actually inside of you. Ask them what it feels like to touch the heart; ask them to describe the texture. This is how your heart functions. Where do you think the heart goes in the chest? Show them where and have each student place his hand over his heart. Show them the 4 chambers of the heart as arteries and veins that come out of the heart ( especially the aorta).

**Station 2: Jessica**

Heart models (introduce chambers - atria & ventricles; right side pumps blood to the lungs, left side pumps blood to the rest of the your body

- The heart works day and night to pump blood through the circulatory system.
- The heart consists of two pumps.
- The pump on the right side of the heart sends blood to the lungs where the blood obtains oxygen.
- The blood which has obtained oxygen then travels back to the heart where it is pumped to all parts of the body.

Using AHA poster, introduce veins & arteries (a for away). Pass out coloring sheets for kids and have them color in blue for veins and red for arteries. Explain that blue represents deoxygenated blood, which must be carried back to the lungs to get more fresh air, and that red represents oxygenated blood (fresh air).

full body model - have kids gather around and point out how extensive the veins and arteries reach in the body. The stronger your heart (through exercise), the more blood can get to the tips of your fingers and to your toes and to your brain.

**Station 3: Daniel**

First ask them if they know what a pulse is and that their heart beat. Have them



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feel their own pulse by either putting two fingers near their neck or wrist. Explain what a healthy heart rate is and that it can vary based on daily activity. (ex. when you sleep heart rate drops)

Feel for your pulse for 15 seconds x 4 = approximately your resting heart rate

Afterwards, introduce the Stethoscope and have student form pairs so that they can hear each other's heartbeat. (Stethoscope # needed = students / 2)

Next have them do Jumping jacks for 10 seconds while hearing an upbeat song

Have them feel their pulse again with both stethoscope and their fingers. They should conclude that their heart rate has gone up. Explanation and reasoning will follow.

### 3. **Wrap-up: Sharing Experiences** \_\_\_\_\_**5**\_\_\_\_\_ **Minutes**

*Putting the pieces together – how will students share learning, interpret experience, build vocabulary?*

Which of these foods are tastier? Which of these foods are healthy/not healthy? Did you know that what you eat affects how healthy your heart is? If you eat more vegetables like this picture of a broccoli, you will have a healthier heart. (Introduce clogged arteries) This is what an unhealthy clogged artery looks like. See all this yellow stuff? If you eat too many fries and hamburgers and Krispy Kreme donut, all this yellow stuff will clog your arteries and blood won't be able to go to all parts of your body. (Pass around occluded artery)

### 4. **Connections & Close:** \_\_\_\_\_**2**\_\_\_\_\_ **Minutes**

So kids remember, your heart is very important and if you take good care of it by eating healthy and consistently exercising, it will take care of you too! :) And you can live a long and happy life!

**Total 50 – 60 Minutes**

## **Follow-up – After Presentation**

Suggest students write a letter explaining what they learned about the heart and the cardiovascular system.

### **Count and Graph Your Pulse**

Count pulse for four different activities: sitting, walking, jogging, skipping. Fill in chart



[http://texasheart.org/HIC/ProjH/upload/grade-4\\_curriculum\\_full.pdf](http://texasheart.org/HIC/ProjH/upload/grade-4_curriculum_full.pdf) (4th to last page)

### **Diagram a family exercise chart**

Plan and fill in chart here: [http://texasheart.org/HIC/ProjH/upload/grade-4\\_curriculum\\_full.pdf](http://texasheart.org/HIC/ProjH/upload/grade-4_curriculum_full.pdf) (Last page)

### **Make an edible heart model**

<http://media-cache-ec0.pinimg.com/736x/a9/bf/c5/a9bfc564cde3c9566c00168744b9dfb2.jpg>

### **Brainstorm:**

- List some activities that contribute to building a stronger heart.
- How would a weak heart effect the movement of blood through the body?
- Name some ways a “weak heart” might affect a person’s daily activities.

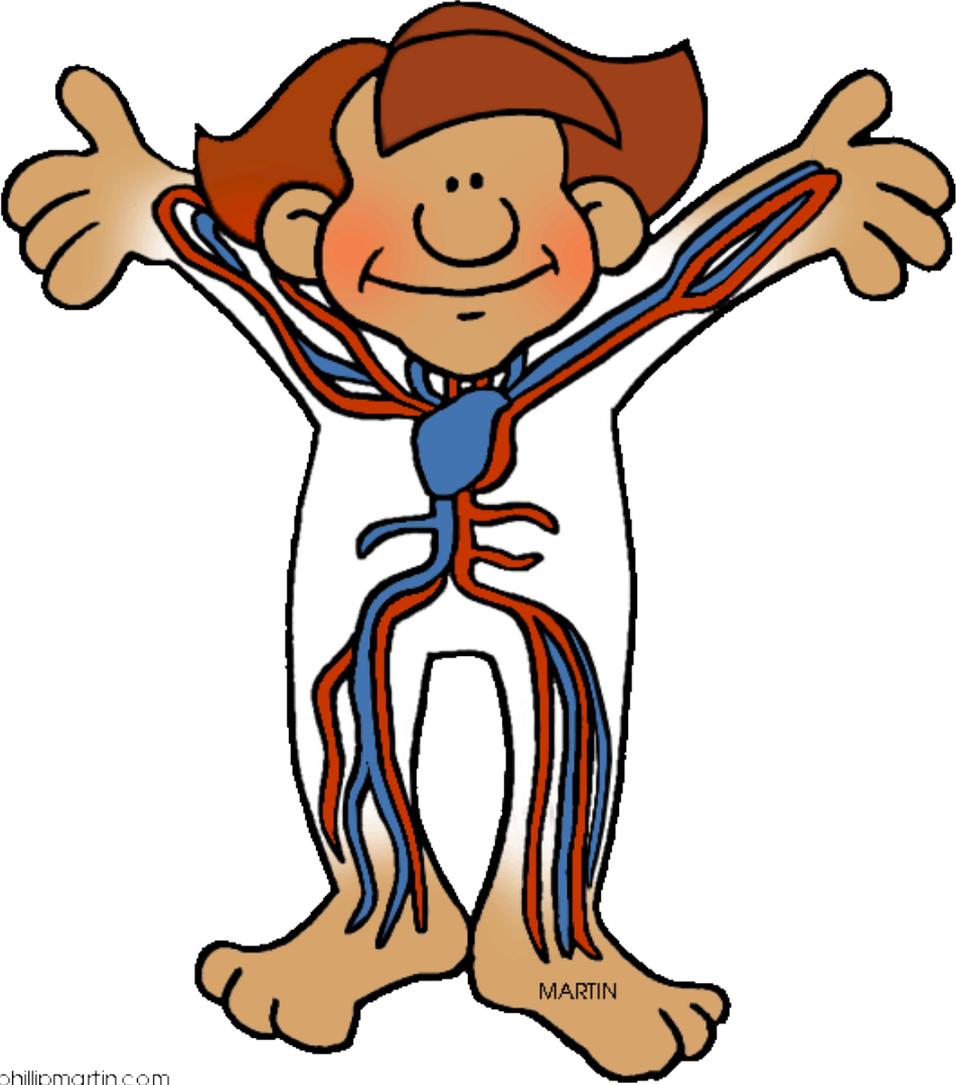


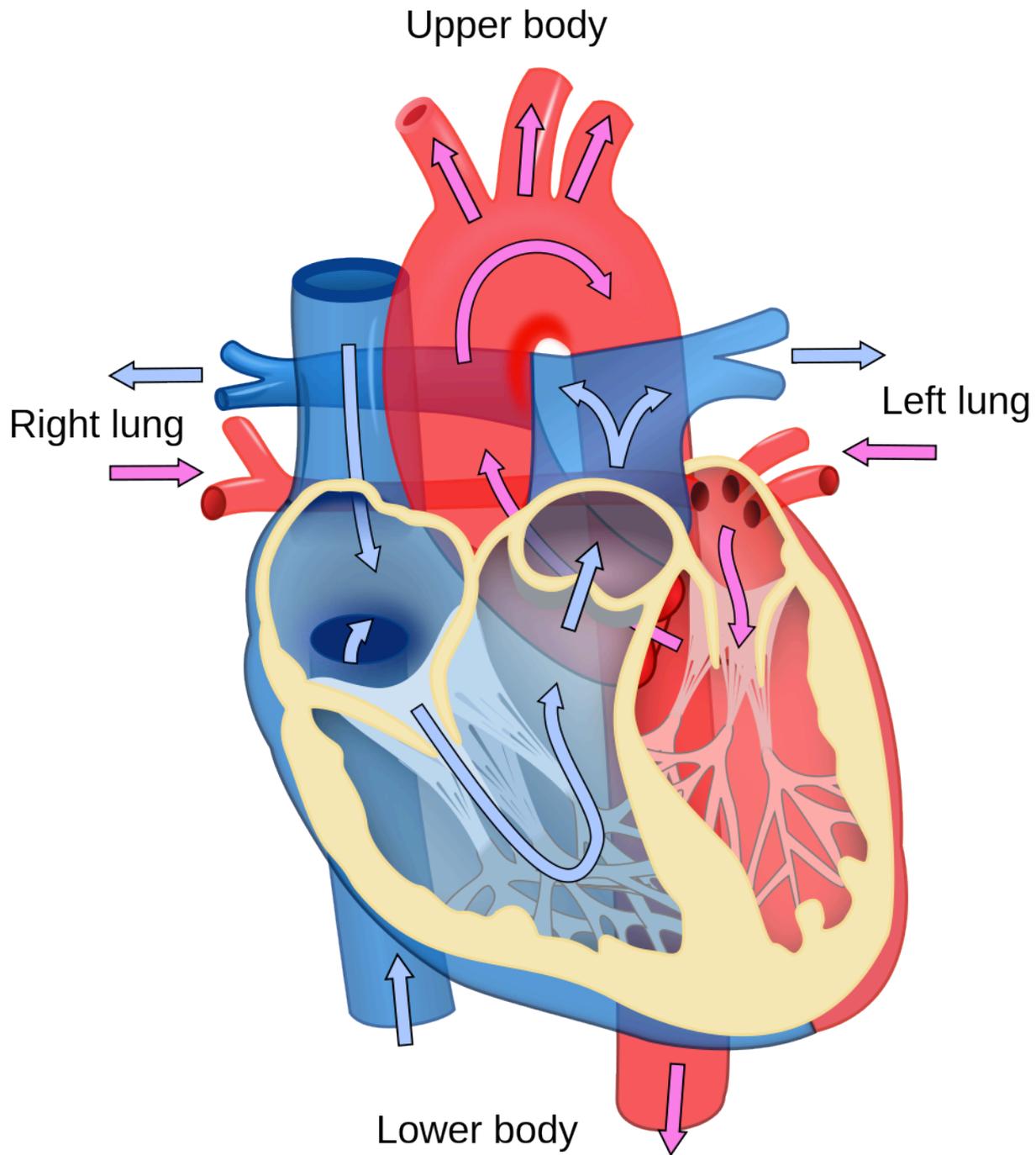
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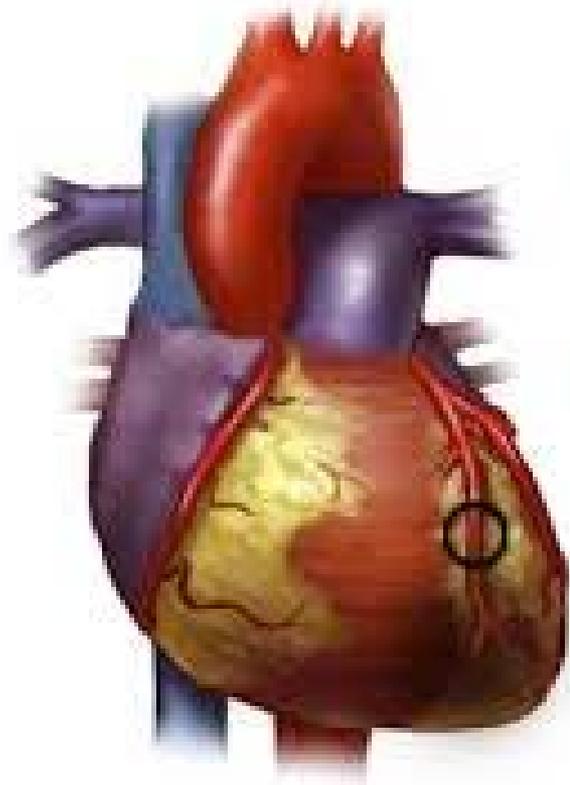
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Normal coronary artery



Atherosclerosis



Atherosclerosis with blood clot

