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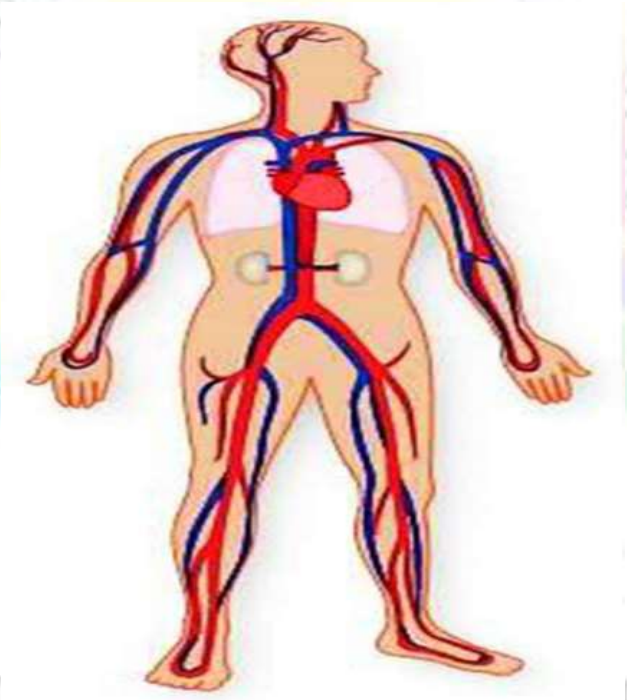
Science

Quarter 1 –Module 2

CIRCULATORY SYSTEM



Science– Grade 7
Quarter 1 – Module 2: Circulatory System: Overview; Parts and Functions

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Explain how the respiratory and circulatory systems work together to transport nutrients, gases and other molecules to and from the different parts of the body.

Supplementary Learning Module for Junior High School Learners

LESSON 2

CIRCULATORY SYSTEM
Overview

Introduction:

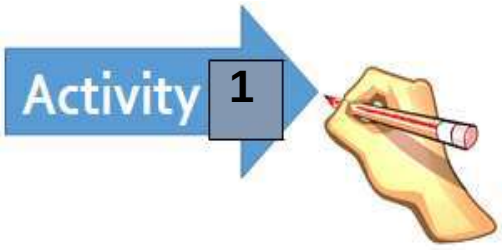
You were introduced to respiratory system in the last supplementary module that you had answered. Now, you will learn how circulatory system work to transport oxygen – rich blood and nutrients to the different parts of the body.

Circulatory system is responsible for distributing materials throughout the body.

Take note that circulation means transportation or movement in circles.

Your objectives for today are the following:

- **Identify the parts of circulatory system.**
- **Explain the functions of the heart, blood And blood vessels in the circulatory system.**
- **Describe blood flow and gas exchange within the heart**
- **Illustrate how the organs work together in circulation**
- **Identify the parts of the heart**
- **Show the importance of the heart through role Play, song, comic writing, hugot lines etc.**



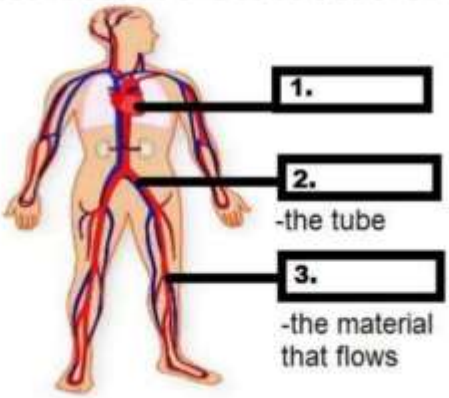
Directions: Form words from the given jumbled letters. These words should be connected with circulatory system.

1. **THREA –**
2. **NEVI –**
3. **BOLDO –**
4. **TARYRE –**
5. **PILARALCY –**

Activity 2

LABEL ME

Directions: Label the parts using blood, blood vessels and heart as choices. Answer the questions below.



1. **What are the organs found in circulatory system?**
   - **a.**
   - **b.**
   - **c.**
2. **What are the functions of each organ?**
   - **a.**
   - **b.**
   - **c.**

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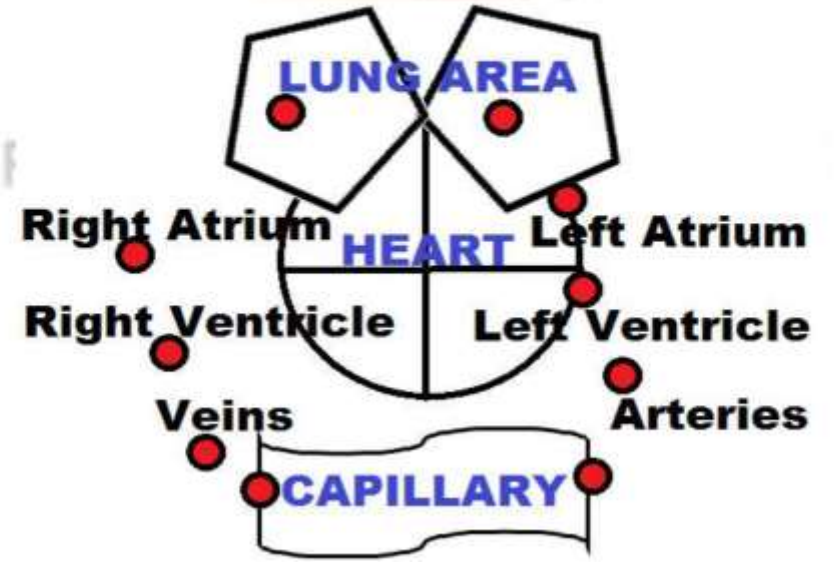
CONNECT ME

Directions: Connect the red dots to illustrate the gas exchange activity within the lungs, capillary and the heart. Don't forget to include the arrow heads to determine where it starts.



1. How do the heart and the lungs work together?

a. **The heart pumps the blood that transports the inhaled oxygen to every cell of the body. Carbon dioxide is given off in the process and is carried by the blood to the lungs and is released through exhalation.**
b. **The heart pumps the blood that transports the inhaled carbon dioxide to every cell of the body. Oxygen is given off in the process and is carried by the blood to the lungs and is released through exhalation.**

2. What takes place when you inhale and exhale?

a. **Gas exchange happens when we inhale and exhale.**
b. **Smelling of scents and absorbing it in the body.**

3. What does blood deliver to every part of the body?

a. **The blood delivers nutrients, carbon dioxide and other chemicals that are absorbed by the body.**
b. **The blood delivers nutrients, oxygen, and other chemicals that are absorbed by the body.**

4. Why is oxygen important to your body?

a. **Oxygen is important to our body because it processes the nutrients in the cell to make energy.**
b. **Oxygen is important because it absorbs all the nutrients needed by our body.**

5. How do you describe the sequence of oxygen, carbon dioxide, and blood flow in your own words?

a. **Oxygen enters the respiratory system through inhalation and then it enters the blood stream to be circulated throughout the body. Carbon dioxide from the tissues enters the blood, then to the lungs where it is exhaled.**
b. **Oxygen and carbon dioxide can move inside and out in the body at the same time.**

(Please remove the options since the learner is required to answer in his/her own words.)

1. **The three major parts of the circulatory system are the heart, blood vessel and blood.**

2. **The heart pumps the blood throughout the body.**

3. **The blood vessel carries the blood throughout the body.**

    a. **The arteries carry oxygenated blood away from the heart to the cells, tissues and organs in the body.**

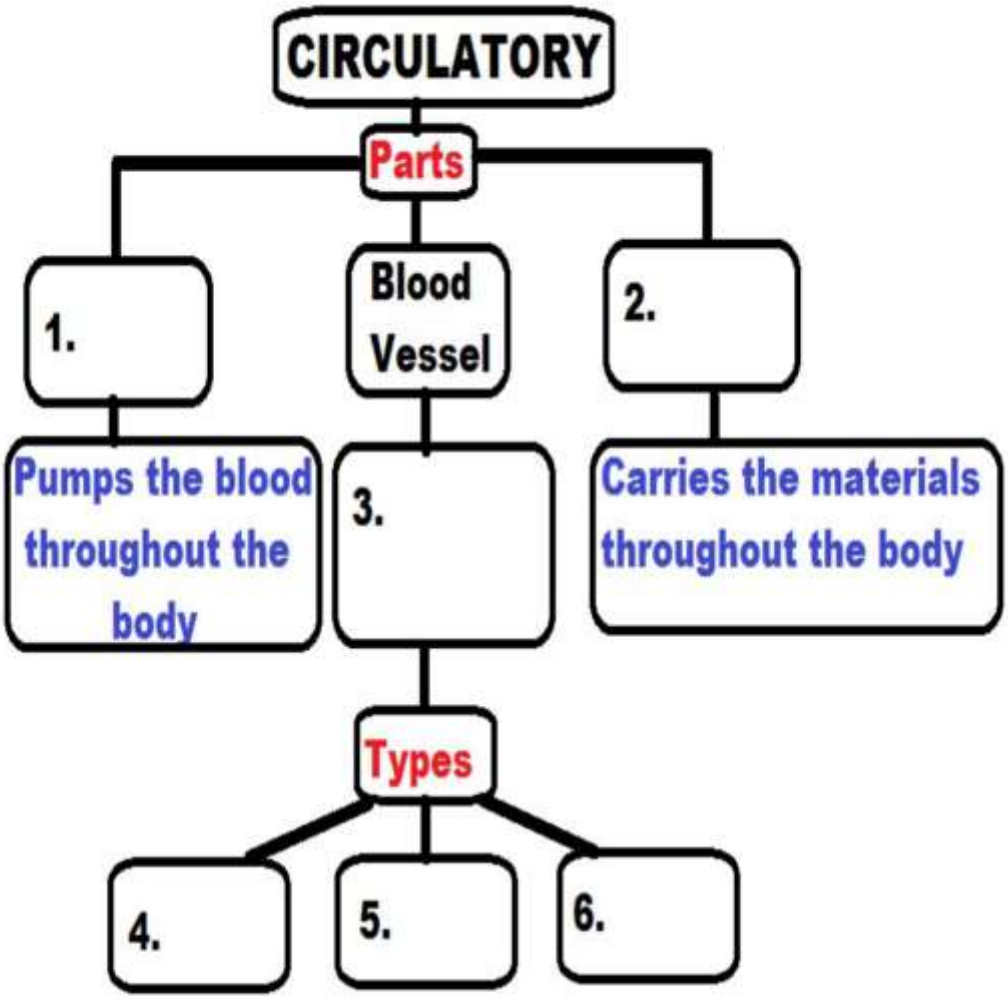
    b. **The veins carry deoxygenated blood to the heart.**

    c. **The capillaries are the smallest blood vessels in the body, connecting the smallest arteries to the smallest veins. It is the actual site where gases and nutrients are exchanged.**

4. **Blood transports the materials throughout the body.**

LET'S ORGANIZE

Direction: Using the graphic organizer, fill in the missing parts, description and functions to complete the entire concept. You can use the previous data.



PUMP IT!

In this activity, you will need a jar half full of water, balloons, plastic straw and big needle. Do the activity following the procedure below answer the questions that follow.

Procedure:

1. **Fill the jar half full of water.**

2. **Cut the neck of the balloon off at the part where it starts to widen into a balloon. Set the neck part aside to be used later on.**

3. **Stretch the balloon over the opening of the jar, pulling it down as tightly as you can. The flatter you can get the surface of the balloon, the better.**

4. **Carefully poke two holes in the surface of the balloon. Make them about an inch apart from each other and near opposite edges of the jar.**

5. **Stick the long part of a straw into each hole. The straws should fit securely in the holes so no air can get through around the straws.**

6. **Slide the uncut end of the balloon neck onto one of the straws and tape it around the straw.**

7. **Set your pump in a large pan or the sink to catch the pumped water. Bend the straws downward. Gently press in the center of the stretched balloon and watch what happens to the water in the jar.**

8. **Refer to the photo below to know what your setup must look like.**

Source: http://www.hometrainingtools.com/make-a-heart-pump-science-project/a/1852/

Guide Questions:

1. **What does the water inside the jar represent?**

    a. **Heart**
    b. **Blood**

2. **How will you compare the heart pump model to the human heart?**

    a. **The heart pump model moves water from the jar through the straws and into the pan. The heart pumps blood out into the body through the arteries in a similar way.**
    b. **The heart pump model is not similar to a human heart in any way.**

3. **How does the heart function as a pump?**

    a. **The heart is filled with blood which is squeezed out to circulate through the whole body.**
    b. **The heart beats to form blood.**

4. **Will the heart model be able to function properly if the straw is blocked? Explain your answer.**

    a. **Yes. The obstruction in the straw does not affect the flow of the blood.**
    b. **No. The blood will not be pumped out of the heart into the body because there is an obstruction.**

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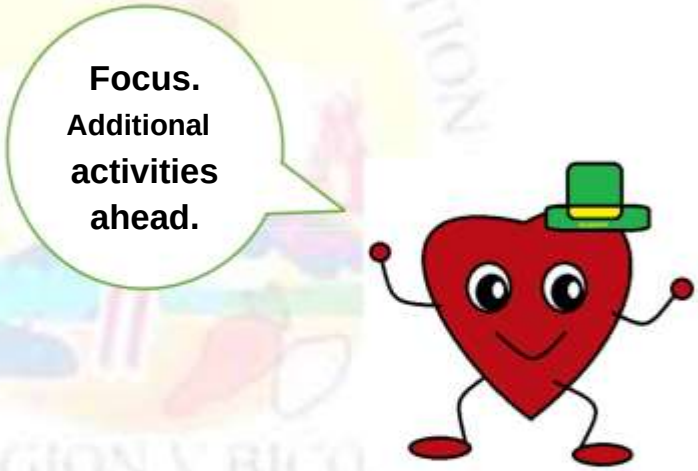


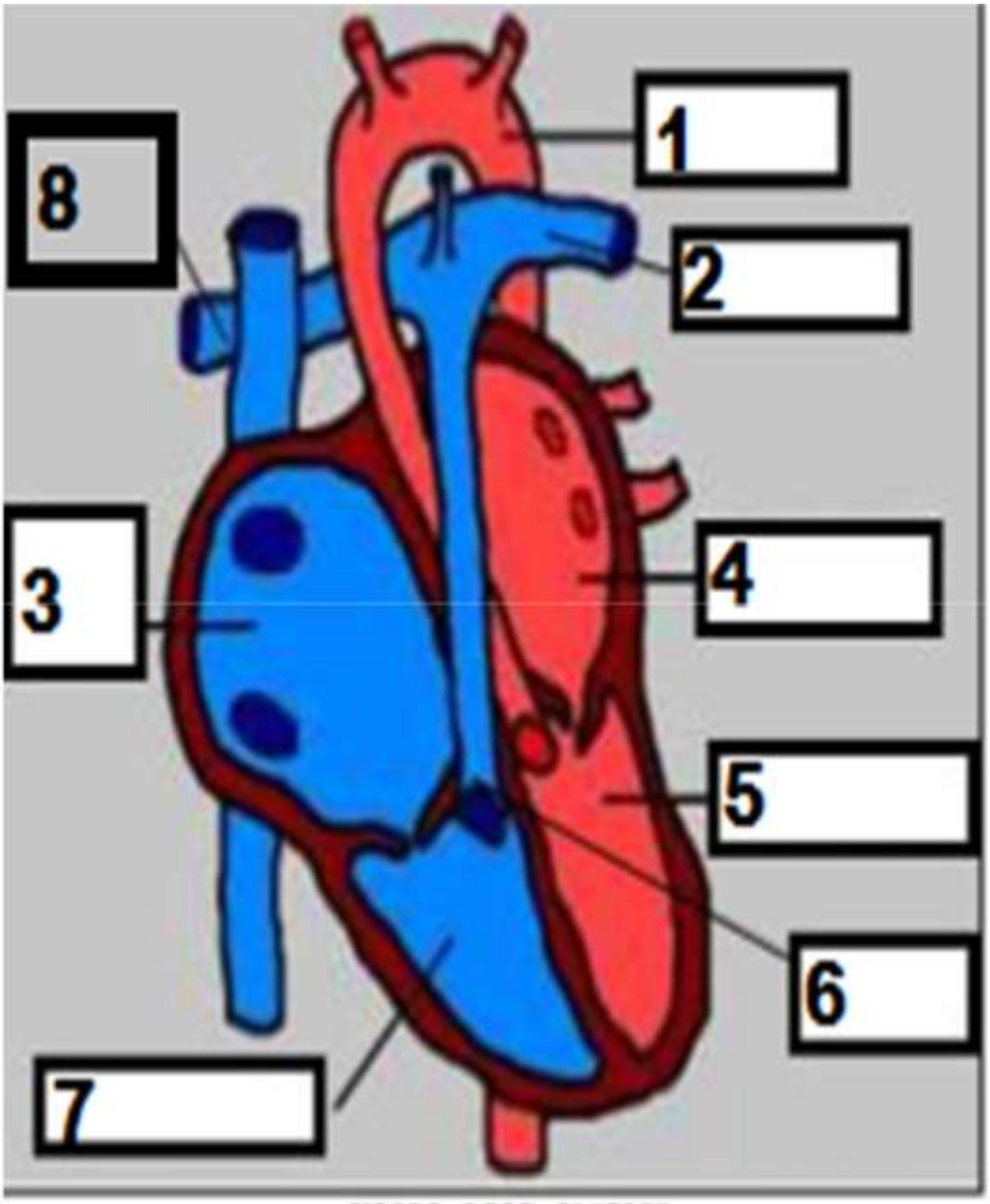
Do you know how big your heart is? Take a look at your fist. The heart is a hollow muscle which is just as big as your fist. It has four chambers with specific tasks to do: two ventricles and two atria. The atria are the receiving chambers of the heart, accepting blood from the body (right atrium) and from the lungs (left atrium). The ventricles are the pumping chambers, moving blood to the lungs (right ventricle) and into the body (left ventricle).

The heart has two pumps. Each pump has two chambers, the upper and lower chambers. The upper chamber is the atrium that receives blood coming in from the veins. The lower chamber is the ventricle that forces the blood out into the arteries. There is a valve between each atrium and ventricle to prevent the blood from flowing backwards. The valves are like one-way doors that keep the blood moving in only one direction. Valves control movement of blood into the heart chambers and out to the aorta and the pulmonary artery.

All of the muscle tissues of the heart do not contract at the same time. Different parts of the heart contract at different times. When the top portion contracts, the bottom part relaxes. When the bottom contracts, the top relaxes. When a chamber contracts, it becomes smaller and the blood inside gets squeezed or pumped out.

THE HUMAN HEART

Directions: Using the previous data, label the parts of the heart.



Watch the following videos to enhance the concepts to be learned. 1. Exploring the Heart - The Circulatory System!

https://youtu.be/-s5iCoCaofc

2. How the heart works

https://youtu.be/tg_ObDJEaGo

Directions: Multiple Choice. Read the questions carefully. Write the correct letter on your paper.

1. **Which of these is a function of the circulatory system?**
   a. **removing wastes from tissues**
   b. **delivering carbon dioxide to cells for cellular respiration**
   c. **transferring impulses from one cell to another**
   d. **all of the above**
2. **Which are the components of the circulatory system?**
   a. **heart and lungs**
   b. **blood vessels, heart, and lungs**
   c. **blood, blood vessels, and heart**
   d. **heart and blood**
3. **Which is the correct direction of blood flow?**
   a. **right atrium right ventricle pulmonary artery**
   b. **right atrium left atrium pulmonary artery**
   c. **left ventricle pulmonary artery aorta**
   d. **left ventricle left atrium aorta**
4. **Which type of blood vessel carries blood away from the heart?**
   a. **Veins**
   b. **Arteries**
   c. **Capillaries**
   d. **lymph nodes**

5. **Which blood cells are most numerous in the body?**
   a. **Red**
   b. **White**
   c. **Platelets**
   d. **Plasma**
6. **Which of the following is a function of blood?**
   a. **fight infection**
   b. **regulate body temperature**
   c. **transport nutrients**
   d. **all of the above**
7. **What is the organ that pumps blood throughout the human body?**
   a. **Lungs**
   b. **Heart**
   c. **Kidneys**
   d. **Blood vessels and capillaries**

8. **Which of the following is a function of blood vessels and capillaries?**
   a. **They pump blood to the heart.**
   b. **They filter impurities from the blood.**
   c. **They carry blood to all parts of the body.**
   d. **They carry messages from the brain to the muscles.**

9. **What happens when a clot occurred in an undamaged blood vessel?**
   a. **You will bleed to death.**
   b. **A scab will form on the skin surface.**
   c. **Platelets stick to the edges of the cut and to one another, forming a plug.**
   d. **The flow of blood to tissues beyond the clot may be cut off.**

10. What could be the reason why the color of the blood that flows from the lungs to the heart is bright red rather than dark red?

a. Oxygen makes it red.

b. Carbon dioxide makes it red.

c. Gastric juices produce the red color of the blood.

d. The lungs add a pigment (dye) to blood as it flows.

Congratulations.
You are almost
done.

1. **The circulatory system is the life support structure that nourishes your cells with nutrients from the food you eat and oxygen from the air you breathe.**

2. **Circulatory system is also known as the cardiovascular system.**

3. **The circulatory system functions with other body systems to deliver materials in the body. It circulates vital elements such as oxygen and nutrients. At the same time, it also transports wastes away from the body.**

4. **The three major parts of the circulatory system are the heart, blood vessel and blood.**

5. **The heart pumps the blood throughout the body.**

6. **The blood vessel carries the blood throughout the body.**

7. **The arteries carry oxygenated blood away from the heart to the cells, tissues and organs in the body.**

8. **The veins carry deoxygenated blood to the heart.**

9. **The capillaries are the smallest blood vessels in the body, connecting the smallest arteries to the smallest veins. It is the actual site where gases and nutrients are exchanged.**

10. **Blood transports the materials throughout the body.**

11. **The heart is a hollow muscular organ, about the size of your fist, which is located in the center of your chest between the lungs. It is a double pump that pumps on the left and right sides.**

12. **Every side is divided into two chambers, the atrium and the ventricle, each of which has a left and right portion, totaling t four chambers altogether.**

13. **The top chamber is the atrium (plural: atria). The bottom chamber is called the ventricle. The valve acts a one – door, allowing blood to flow either forward into the next chamber, or out of the heart.**

14. **Air first enters your lungs and then into the left part of your heart. It is then driven by your heart into the bloodstream, all the way through your body.**

15. **The heart pumps blood, which transports essential nutrients, oxygen and other chemicals to every cell in your body.**

16. **Once it reaches the cells, oxygen processes the nutrients to release energy.**

17. **Carbon dioxide is given off during this process. The blood delivers carbon dioxide into the right portion of your heart, from which it is pumped to the lungs. Carbon dioxide leaves your body through the lungs when you exhale.**

ANSWER KEY:

Activity 1: ARRANGE ME

1. Heart
2. Vein
3. Blood
4. Artery
5. Capillary

Activity 2: LABEL ME

1. Heart
2. Blood vessels
3. Blood
4.
    a. Heart
    b. Blood vessels
    c. Blood
5.
    a. Heart – pumping organ in the body
    b. Blood vessels – the tubes where the blood flows
    c. Blood – the material that flows that supplies nutrients and oxygen in all parts of the body.

Activity 3: CONNECT ME

Lung Area → → Capillary → Lung Area

Left Atrium → Veins → Left Ventricle → Right Ventricle → Arteries → Right Atrium

1. A
2. A
3. B
4. A
5. A

Activity 4: LET'S ORGANIZE

1. **Heart**
2. **Blood**
3. **Carries the blood throughout the body**

For Numbers 4 – 6, in any order.

4. **Arteries**
5. **Veins**
6. **Capillaries**

Activity 5: PUMP IT!

1. **B**
2. **A**
3. **A**
4. **B**

Activity 6: THE HUMAN HEART

1. **Aorta**
2. **Left Pulmonary Artery**
3. **Right Atrium**
4. **Left Atrium**
5. **Left Ventricle**
6. **Valve**
7. **Right Ventricle**
8. **Right Pulmonary Artery**

EVALUATION

1. **D**
2. **C**
3. **C**
4. **B**
5. **A**
6. **A**
7. **B**
8. **C**
9. **D**
10. **A**

REFERENCES:

Science 9 Learning Module

Internet Sources:
http://www.hometrainingtools.com/make-a-heart-pump-science-project/a/1852/

Videos:
1. Exploring the Heart - The Circulatory System! https://youtu.be/-s5iCoCaofc
2. how the heart works
https://youtu.be/tg_ObDJEaGo