






Comparing Circulatory/Vascular Systems of Humans and Plants

Overview:


Students will learn some of the similarities between animal circulatory systems and plant vascular systems. They will learn that trees and humans both need each other to survive. They will learn how oxygen is transported to humans from plants.

Objectives:


At the end of the lesson students will be able to:

-  List physical/functional similarities of the circulatory/vascular systems of animals and plants.
-  Identify physical/functional differences of the circulatory/vascular systems of animals and plants.
-  Describe how water travels through plants' leaves.


Preparation:

-  Prior to the lesson, bring in one poster of the vascular system in a tree and one of the circulatory system in a human.

Vocabulary:

-  **In animals:**
- circulatory system
 - cardiac
 - atrium/atria
 - ventricles




- veins
- arteries
- oxygen rich/poor blood

-  **In plants:**
- vascular system
 - nutrients
 - phloem tissue
 - xylem vessels



Learning Activities:

- I. Warm-Up (5 min.)


Materials:

-  Tree branch (with leaves and needles)
-  Poster of vascular system of a tree
-  Poster of the circulatory system in a human


On the Board:

-  Vocabulary
-  Student Reflection Questions

Suggested Snack:

-  Seasonal produce

Other Materials:

-  For Garden Activity:
 - Cup of water
 - Plant stem and leaf
 - Red food coloring
 - Camera

- A. Ask students to describe what items grow outward from the trunks of trees? (branches with leaves/needles)
 - What holds the tree up above ground and what supports the tree underground? (trunks; roots)
 - What functions do these parts have? How do they help the tree live?
2. Discussion Activity (15 min.)
 - A. Ask students to describe what **plants** have on their...
 - tops (branches, leaves, flowers)
 - middle (stems, trunk)
 - bottoms (roots)
 - B. Explain that plants have *phloem tissue* that carries sugar and other nutrients from the leaves down the plant. They have *xylem tissue* that carries water and nutrients from the roots in the soil up the plant.
 - C. Explain how, in humans, the heart gets oxygen from the lungs and then the arteries carry this “oxygen-rich blood” to all the organs in our bodies.
 - Using the human circulatory system poster, ask students: What carries the “oxygen-poor blood” back to the heart? (veins)
 - D. Explain to students how we breathe in oxygen and breathe out carbon dioxide. Plants need carbon dioxide to grow and then they produce oxygen back into the air that we breathe. Thus, we benefit from each other’s presence!
3. Activity Options (30 min.)
 - A. Writing Prompt
 - Make an assertion that animals and plants have similar circulatory/vascular systems. Make sure students include:
 - An assertion
 - Two reasons to support their assertion
 - A summary sentence
 - B. Garden Activity: Explore How Water Travels Through Leaves
 - Cut the stem of a leaf and put it in a cup of water.
 - Add one drop of red food coloring and allow it to sit there for a week.
 - Take photos daily for one week.
 - Observe what the leaf looks like after one week.
4. Snack: Serve a ripe fruit or vegetable and explain how carbon dioxide was necessary for its growth. (5 min.)
5. Have students answer the Reflection Questions in their garden journals. (5 min.)

Student Reflection Questions:

1. Do you think humans could survive without plants? Why or why not?
2. How does oxygen get to the heart?
3. What do you think will happen to plants if they have no carbon dioxide?

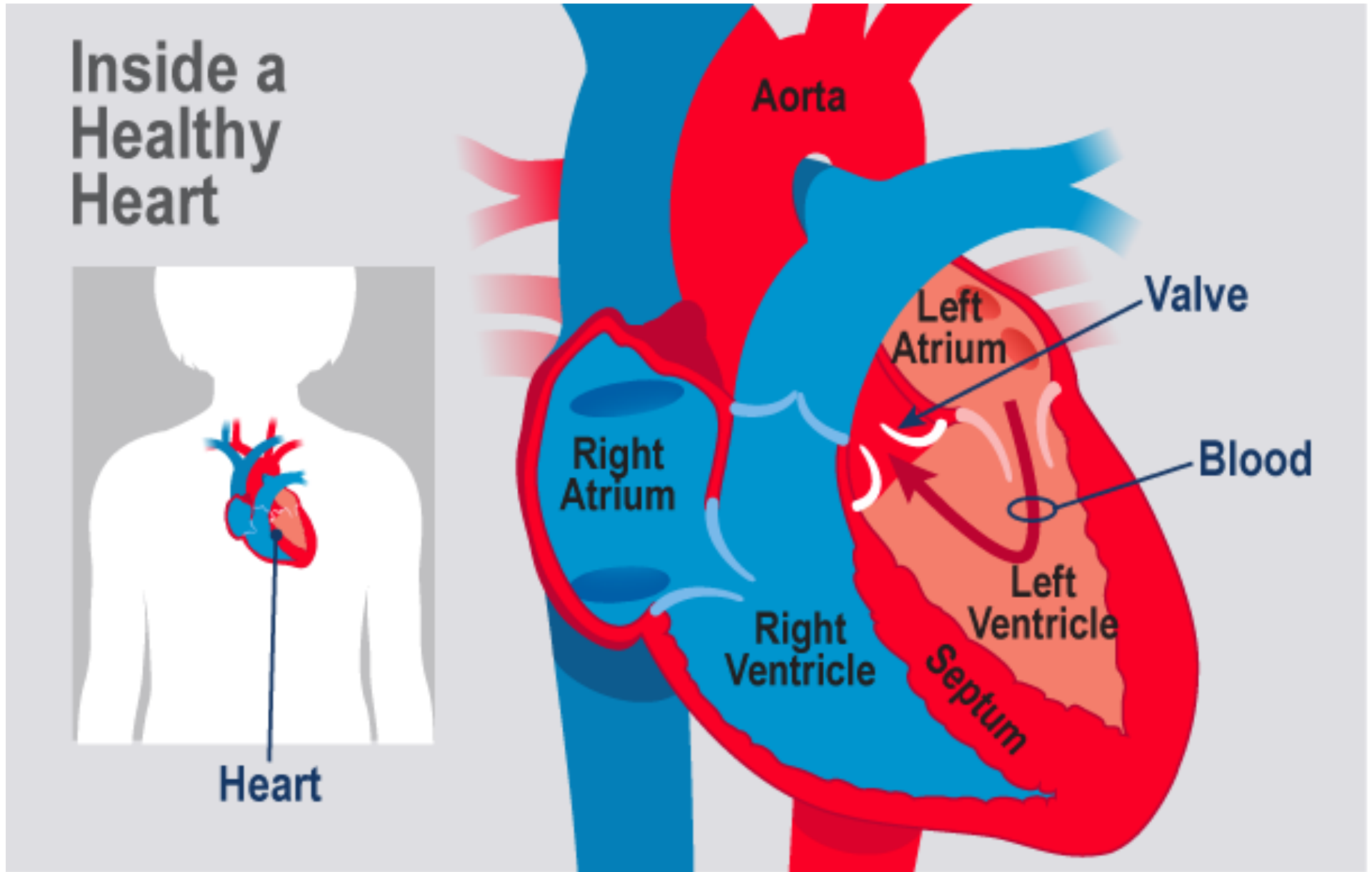
Assessment Questions:

1. Name one of the parts of the heart.
 - **ventricle, atrium**
2. The movement of blood through the heart and the body is called:
 - A. **circulation**
 - B. locomotion
 - C. heart pump
3. What are some challenges that both plants and animals face in staying alive?
 - **They both need ways to get food, oxygen, and water. They need to break down food for energy. Plants need carbon dioxide. They also need a way to take in sunlight.**
4. Vascular tissue forms long tubes of cells that carry water and other substances through a plant. Does an animal (e.g., human) have anything like that
 - **Animals and humans have a circulatory system with vessels that carry nutrients to the cells.**
5. What is a compound that humans need to survive, and what compound do humans produce that allows plants to survive?
 - A. **oxygen and carbon dioxide**
 - B. oxygen and nitrogen
 - C. carbon dioxide and sugar
 - D. nitrogen and hydrogen

Standards:

Next Generation Science Standards

- MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function of a system.
- MS-LS1-3. Use an argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.



Plant Tissues and The Vascular System

