

Project Title: Modeling Blood Circulation in the Human Body

NGSS Standard:

MS-LS1-3 - Use argument supported by evidence for how the circulatory system functions as an interacting subsystem composed of the heart, blood vessels, and blood cells to transport nutrients and oxygen throughout the body.

Florida Benchmark:

SC.6.L.14.5 - Identify and investigate the general functions of the major systems of the human body (e.g., digestive, respiratory, circulatory, reproductive, excretory, immune) and describe ways these systems interact with each other to maintain homeostasis.

Objective:

By the end of this project, students will be able to:

1. Construct a working model that demonstrates how blood circulates through the body.
2. Explain the function of the heart, arteries, veins, and capillaries.
3. Describe the interaction between the circulatory and respiratory systems.

Materials:

- Clear tubing (to represent blood vessels)
- Hand pump or squeeze bulb (to act as the heart)
- Red and blue food coloring (to distinguish oxygenated and deoxygenated blood)
- Water (to simulate blood flow)
- Small plastic cups (to represent organs)
- Funnels
- Tape and scissors
- Worksheet for recording observation

Safety Precautions:

- Handle scissors with care.
- Work in a designated area to avoid spills.
- Do not consume any materials used in the experiment.
- Clean hands after handling food coloring.

Procedures:

1. **Prepare the Blood Vessels:**

- Cut clear tubing into three sections: one for arteries, one for veins, and one for capillaries.
 - Use tape to secure them in a loop-like pattern representing systemic circulation.
2. **Set Up the Heart Model:**
 - Attach a hand pump or squeeze bulb to the tubing to represent the heart.
 - Label the pump as the heart, and the tubes as arteries, veins, and capillaries.
 3. **Simulate Blood Flow:**
 - Mix water with red food coloring to represent oxygen-rich blood.
 - Mix another batch with blue food coloring to represent oxygen-poor blood.
 - Pour red-colored water into the 'heart' and squeeze the pump to move the liquid through the 'arteries.'
 4. **Oxygen Exchange:**
 - At the 'capillaries,' switch red water for blue water to show oxygen exchange.
 - Continue the cycle, pumping blue water through 'veins' back to the heart.
 5. **Repeat the Process:**
 - Run multiple cycles to observe circulation patterns.
 - Discuss how this process mimics real blood flow.
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Note: Clean-up

- Dispose of water properly.
 - Rinse and dry materials for future use.
 - Wipe down work areas to remove any spills.
 - Return all supplies to their designated locations.
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Comprehension Questions:

1. What is the function of the heart in the circulatory system?
2. How do arteries and veins differ in their roles?
3. What happens to blood as it passes through the capillaries?
4. How does the circulatory system interact with the respiratory system?
5. Why is it important for blood to circulate continuously throughout the body?