

The Cardiovascular System

Established Goals	Transfer	
	<p><i>By the end of this unit, students will be able to...</i></p> <ul style="list-style-type: none"> • Design and analyze an experiment to evaluate lifestyle factors on cardiovascular health. 	
	Meaning	
	<p><i>UNDERSTANDINGS: Students will understand that ...</i></p> <ul style="list-style-type: none"> • Heart rate, EKG, and blood pressure measurements are indicators of a person's overall cardiac health. • Experiments are designed to find answers to testable questions. 	<p><i>ESSENTIAL QUESTIONS:</i></p> <ul style="list-style-type: none"> • How can machines be used to collect and analyze cardiovascular data? • What do heart rate, blood pressure, and EKG data reveal about cardiovascular health? • What role does lifestyle play in the development of heart disease?
Acquisition		
<p><i>KNOWLEDGE: Students will ...</i></p> <ul style="list-style-type: none"> • Recognize that the heartbeat is caused by the contraction of muscle cells and results in the movement of blood from the heart to the arteries and the rest of the body. • Recognize that heart rate is the number of heart contractions per unit of time, usually per minute. • Recognize that blood pressure is a measure of the force put on the vascular walls by the blood as it is pushed by the cardiac muscles through the blood vessels. • Recognize that the electrical activity of the heart can be measured and recorded by an electrocardiogram (EKG or ECG). • Describe how internal and external factors can affect heart function and can contribute to the development of heart disease. • Recognize that all external variables in an experiment need to be controlled. 	<p><i>SKILLS: Students will ...</i></p> <ul style="list-style-type: none"> • Measure heart rate and blood pressure manually and with scientific software and probes. • Design controlled experiments to test the effect of factors such as exercise or body position on heart rate and blood pressure. • Analyze EKG readings and relate data to heart function. 	

Activity

Students will demonstrate knowledge and skills by...

- Designing and conducting an experiment to measure heart rate.
- Investigate the impact of blood pressure on cardiovascular health.
- Use an electrocardiogram (EKG) to study the electrical activity of the heart.

Students will:

1. Work in pairs as one person as the physician and the other as the patient. Examine different patient's medical history (provide mock medical records) and note any evidence of cardiovascular complications or abnormalities in the medical history. Then, switch roles with a new scenario so each student has the opportunity to be both the patient and the physician.
2. Measure pulse and heart rate
3. Use probes to determine heart rate using different scenarios (resting heart rate, change in temperature, body position, etc).
4. Use a sphygmomanometer to measure blood pressure.
5. Design an experiment that uses probes to determine blood pressure.
6. Create a diagram or concept map of the pathway of electrical conduction within the heart and correlate it to the EKG waves.
7. Review the medical history and determine the evidence of cardiovascular complications.

Assessment

1. Check for understanding throughout the activity.
2. Review the research plans and design formulated by the students prior to conducting the experiments and provide relevant feedback.
3. Students will explain their experimental design, procedures, methods, and results. Following, students must analyze the data and provide a diagnosis for the patient based on their findings.