Anatomy and Physiology - Unit 2 - Nervous System or Cardiovascular System

Unit Focus

After performing experiments regarding the nervous and cardiovascular systems, the students will have the choice of which system they would like to investigate in depth. The nervous system unit will include an investigation of one sense of the student's choice. The cardiovascular system unit will include an investigation of a cardiovascular disease. Throughout the unit, students will work to uncover the details of their chosen system and develop a model and website to explain the structures and functions of the body system. The website, which will include the student-developed model, will be used for the summative assessment in which students will analyze a case study and determine the physiological cause of the symptoms. This unit will include a dissection. If a student does not want to participate in a dissection, they may opt to perform an alternate assignment.

Stage 1: Desired Results - Key Understandings

Standard(s)

Next Generation Science
High School Life Sciences: 9 - 12

- Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. *HS-LS1-2*

Next Generation Science Standards (DCI)
Science: 10

- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. *LS1.9.A3*

Madison Public Schools Profile of a Graduate
Collaboration/Communication

- Product Creation: Effectively use a medium to communicate important information. (POG.3.2)

Transfer

T1 Create models to explore complex systems, show mastery of key science concepts, and/or develop solutions through creation of a product open to testing and redesign.
T2 Communicate effectively based on purpose, task, and audience to promote collective understanding and/or recommend actions.

Meaning

Understanding(s)	Essential Question(s)
U1 The structure of a given organ or organ system is related to its function. **U2** Individual components of a body system all work together to create a functioning system. **U3** When the natural feedback loops or structures and functions of a system fail, typical symptoms will manifest that can be used to analyze the underlying causes of the issue.	**Q1** How does structure relate to function? **Q2** How do the components of a body systems function together to allow organisms to complete a specified task, either voluntarily or involuntarily? **Q3** How can I explain the results of my experiment using my understanding of the body system I am investigating? **Q4** How can I apply my understanding of how body system work to analyze a medical issue?

Acquisition of Knowledge and Skill

Knowledge	Skill(s)
K1 The nervous system is organized into subsystems that have different structures and functions. **K2** Nerves and neurons are part of the nervous system and have similarities and differences.	**S1** Conducting research to investigate, model, and communicate detailed information about a body system. **S2** Developing a visual model that explains how the individual parts of a body system work together to make a functioning system.

Stage 1: Desired Results - Key Understandings		
	K3 The major structural components of a neuron are the dendrites, cell body, axon, axon terminals. All of which have specific structures and functions vital to their role in transmitting messages. **K4** Sensory neurons transmit impulses from sense organs to the central nervous system, while motor neurons bring impulses from the central nervous system to the target muscle, gland, etc. **K5** Students will know the structure and function of the spinal cord. **K6** The central nervous system's primary structures are the spinal cord, spinal nerves and dorsal and ventral roots, all of which have a specific structure and function that allows them to perform their intended function. **K7** The major structures of the brain are: the cerebrum and associated lobes, cerebellum, and brain stem including the midbrain, pons, and medulla oblongata. **K8** The cells associated with the sense of sight (rods and cones), have specific locations and structural organization that allows them to function within a system and allow for vision. **K9** Students will know the path that visual information takes through the brain and where in the brain that visual information is processed. **K10** The heart is a complex organ that has multiple layers, chambers, and functions, all of which work in harmony to allow it to move blood through the body. **K11** The heart generates its own electricity and has a specific path that the electrical current takes through the heart which determines the sequence of a heart beat. **K12** Blood moves in a specific way through the heart, lungs, and body so that oxygenation blood can move through the body and deoxygenated blood and be returned to the lungs and eliminated from the body. **K13** An EKG/ECG is an effective tool used by medical professionals that allow them to learn about the heart health of a person. **K14** Students will know how to read an EKG/ECG graph and explain what each peak/valley represents. **K15** Students will know the causes and treatments for coronary heart disease.	**S3** Creating a website that correctly uses medical terminology and that can be used as a reference for others to learn about a chosen body system. **S4** Analyzing case studies and applying content to determine the physiological cause of the condition.