Madison Public Schools

Grade 7 - Unit 4 - Human Body Performance

Unit Focus

Using Usain Bolt's sprinting abilities as an anchoring phenomenon for the unit, students will develop a deep understanding about the interdependence of the circulatory, respiratory, and excretory systems. Students will perform laboratory investigations that explore homeostasis by measuring heart and breathing rate and will apply graphing skills to quantify their results to demonstrate cause and effect relationships that maintain homeostasis. As students explore the body systems, they will develop their own model of the three systems working together. This model will be revisited and revised throughout the unit as new learning is uncovered. Students will also have the opportunity during this unit to use medical equipment that is utilized by healthcare professionals to assess health. Ultimately, students will demonstrate their understanding of the interconnection of the body systems by analyzing and applying their knowledge to case studies of human ailments and producing a final scientific model of the systems working together.

Stage 1: Desired Results - Key Understandings

Established Goals

Next Generation Science
High School Life Sciences: 9 - 12
- Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. *HS-LS1-3*

Middle School Life Science: 6 - 8
- Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. *MS-LS1-3*

Next Generation Science Standards (DCI)
Science: 7
- In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. *LS1.6.A3*
- Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. *LS1.6.C2*

Student Growth and Development 21st Century Capacities Matrix
Critical Thinking

Transfer

T1 Communicate effectively based on purpose, task, and audience to promote collective understanding and/or recommend actions.
T2 Analyze qualitative and quantitative data to interpret patterns, draw conclusions, and/or make predictions.

Meaning

Understandings

U1 In multicellular organisms cells, work together in groups to form tissues and organs with specific functions to ensure survival.
U2 The body systems in organisms work together to allow the organisms to perform it's necessary functions.
U3 Feedback mechanisms maintain an organism's internal conditions (homeostasis) within certain limits and allows them to survive as conditions change

Essential Questions

Q1 How do different body systems work together to maintain homeostasis?
Q2 How do bodies stay healthy and active?
Q3 How do cells/systems group together to perform a particular body function?

Acquisition of Knowledge and Skill

Knowledge

K1 In multicellular organisms the body is a system of multiple interacting sub-systems. These sub-systems are groups of cells that work together to perform particular body functions.

Skills

S1 Synthesizing and applying information to determine how the three body systems (circulatory, respiratory, and excretory) work together.
S2 Use argument supported by evidence for how the body

Stage 1: Desired Results - Key Understandings		
• Synthesizing: Students will be able to thoughtfully combine information/data/evidence, concepts, texts, and disciplines to draw conclusions, create solutions, and/or verify generalizations for a given purpose. *MM.1.3* *Collaboration/Communication* • Product Creation: Students will be able to effectively use a medium to communicate important information (findings, ideas, feelings, issues, etc.) for a given purpose. *MM.3.2*	**K2** The major parts of the human circulatory system are the heart, arteries, veins, and capillaries. The right side of the heart pumps blood to the lungs for gas exchange; the left side of the heart pumps the oxygenated blood around the body. **K3** The blood is made up of plasma, red and white blood cells, and platelets. Its main role is to carry small nutrients and respiratory gases (oxygen and carbon dioxide) to and from cells. Blood cells are also responsible for destroying invading particles, preventing diseases and stopping bleeding after injuries. **K4** The major parts of the human respiratory system are the nose, trachea, bronchi, lungs and diaphragm. This system is responsible for breathing and exchange of gases between the body and its surroundings. **K5** The major parts of the excretory system are the kidneys, bladder, ureters, and urethra. This system is responsible for removing waste products from the blood and the body. **K6** Vocabulary: homeostasis, circulatory, atrium, ventricle, pulmonary, artery, vein, capillary, aorta, vena cava, valves, plasma, platelets, blood cells, respiration, trachea, bronchi, pharynx, larynx, alveoli, excretion, kidneys.	is a system of interacting sub-systems composed of groups of cells. **S3** Apply understanding of how the body systems interact to health issues.