Anatomy and Physiology I

| Topic | Characteristics of Life<br>(1 week) | Structural Organization<br>(3 weeks) | Chemistry of Life<br>(2 weeks) | Biochemistry<br>(2 weeks) |
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| NJSLS | LS1-3<br>LS1.A | LS1-2<br>LS1.A | LS1-6<br>LS1.C<br>PS1.B | LS1-1<br>LS1-3<br>LS1-6<br>LS1.A<br>LS1.C<br>LS3.A<br>PS1.B |
| ELA | WHST.9-12.7<br>WHST.11-12.8 | SL.11-12.5 | RST.11-12.1<br>WHST.9-12.2<br>WHST.9-12.5 | RST.11-12.1<br>WHST.9-12.2<br>WHST.9-12.5;<br>WHST.9-12.7<br>WHST.11-12.8 |
| Technology Ed. | 8.1.12.DA.1,5 | 8.1.12.DA.1,5 | 8.1.12.DA.1,5 | 8.1.12.DA.1,5 |
| 21st Century Knowledge & Skills | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 |
| Skills<br>(SWBAT) | Define the terms anatomy and physiology and give three examples of each<br><br>List the major characteristics of life and give examples of each | List and describe in order of increasing complexity, the levels of structural organization of the human body<br><br>Demonstrate the term “anatomical position” | Distinguish between matter and energy and classify each<br><br>Describe three energy forms<br><br>List the most common elements found in the human body | Distinguish between organic and inorganic compounds<br><br>Differentiate between a salt, an acid, and a base and give an example of each |

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| | List and describe the survival needs of the human organism<br><br>Define homeostasis and discuss its importance<br><br>Give examples of negative feedback | List the major body cavities and subdivisions<br><br>List and describe the major directional terms and planes used in describing the body<br><br>Use appropriate terms to describe relative positions, body systems, and body regions<br><br>List the eleven major organ systems of the body<br><br>Describe the functions of the major organ systems<br><br>Define important terminology related to the levels of structural organization | Differentiate between elements and atoms<br><br>Describe radioisotopes and their role in the diagnosis and treatment of disease<br><br>Explain the importance of chemical reactions and the role of electrons in chemical bonding<br><br>Explain the relationship between molecules and compounds<br><br>Differentiate between ionic, covalent, and hydrogen bond and give two examples of each<br><br>Describe chemical reactions that occur in the body and give two examples of each<br><br>Define important terminology related to chemistry | Explain the importance of water for maintaining homeostasis in the body<br><br>List three examples of the role of water in the body<br><br>Explain what is meant by the concept of pH and identify the pH value for blood and urine<br><br>Compare and contrast carbohydrates, lipids, proteins, nucleic acids, and amino acids in terms of their functions in the body<br><br>Identify the differences between structural and functional proteins<br><br>State the difference between DNA and RNA in terms of their structure and function<br><br>Describe A TP and explain its importance in the body<br><br>Define important terminology related to biochemistry |
| Activities | PowerPoint Presentations<br><br>Lab Activities | PowerPoint Presentations<br><br>**Formative Assessment:** | PowerPoint Presentations<br><br>Lab Activities | PowerPoint Presentations<br><br>Lab Activities |

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| | | Students will write 10 sentences regarding one of the body systems. Students must use relevant body regions, cavities, and/or directional terms in each sentence to describe the organ system.<br><br>Lab Activities | | |
| Evaluation | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook |
| Resources | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos |

| Topic | Cells<br>(2 weeks) | Integumentary System<br>(5 weeks) | Skeletal System<br>(5 weeks) | Muscular System<br>(5 weeks) |
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| NJSLS | LS1-1<br>LS1-2<br>LS1-4<br>LS1.A<br>LS1.B | LS1-2<br>LS1.A | LS1-2<br>LS1.A | LS1-2<br>LS1.A |

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| ELA | RST.11-12.1<br>WHST.9-12.2<br>WHST.11-12.8<br>WHST.9-12.9<br>SL.11-12.5<br><br>MP.4 (mathematics) | SL.11-12.5 | SL.11-12.5 | SL.11-12.5 |
| Technology Ed. | 8.1.12.DA.1.5 | 8.1.12.DA.1,5 | 8.1.12.DA.1,5 | 8.1.12.DA.1,5 |
| 21st Century Knowledge & Skills | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 |
| Skills (SWBAT) | Identify the general characteristics of a typical animal cell<br><br>Explain how the structure of the cell membrane is related to its function<br><br>Identify each cytoplasmic organelle on a diagram or slide and discuss the function of each<br><br>Sketch a typical animal cell and label its parts<br><br>Describe the structures of a cell nucleus and its parts<br><br>Describe the processes that transport materials in and out of a cell | List and describe the functions of the integumentary system<br><br>Describe the structure and function of the epidermis, dermis, and hypodermis<br><br>Describe the structure of hair and nails and their growth processes<br><br>Name three glands of the skin and describe their function<br><br>Describe the function and importance of melanin<br><br>List and describe the three classifications of burns<br><br>Explain the importance of the "rule of nines" | Identify subdivisions of the skeletal systems<br><br>Differentiate between the axial and appendicular skeletal systems<br><br>List five functions of the skeletal system<br><br>List and give an example of the five classifications of bones<br><br>Explain the role of bone salts and the organic matrix in making bone both hard and flexible<br><br>Describe the process of bone formation | Describe the function of the muscular system<br><br>Compare and contrast the three types of muscle tissues<br><br>Describe the four major characteristics that enable muscular tissue to carry out its functions and maintain homeostasis<br><br>Identify the major parts of a skeletal muscle fiber and describe the functions of each<br><br>Describe the structure and function of the neuromuscular junction and a motor unit |

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| | Predict whether a cell will swell or shrink under various conditions<br><br>Explain the processes of DNA replication and of mitosis<br><br>Describe and explain the importance of cell division<br><br>Describe the stages of life of a cell, and summarize the importance of mitosis with respect to maintaining a constant chromosome number<br><br>Describe the roles of DNA and RNA in relation to protein synthesis<br><br>List and describe the three types of RNA<br><br>List and identify on a diagram or slide, the four major body tissues and explain their structural differences<br><br>Identify the functions of the four major body tissues and identify their locations<br><br>Compare epithelial with connective tissue | List and compare the structure of the major membrane types and locate each in the body<br><br>Name three types of skin cancer and their causes<br><br>Identify how aging affects the integumentary system<br><br>List and describe diseases/disorders associated with the integumentary system<br><br>Define important terminology related to the integumentary system | Identify and name the bones of the skull<br><br>Explain the function of the fontanel on a newborn skull<br><br>Describe the differences between a newborn and an adult skull<br><br>Name the parts of the vertebral column and describe their differences<br><br>On a skeleton, identify the parts of the axial and appendicular systems<br><br>Identify the three major classifications of joints and give examples of each<br><br>Describe the structure of long bones and explain the functions of its parts<br><br>Compare the main types of joints and describe their structure and function<br><br>Identify and explain the three abnormal spinal curvatures<br><br>Differentiate between a male and a female pelvis and identify the reason for the difference | Describe the major events that occur during muscle fiber contraction<br><br>Identify ATP as the source of energy<br><br>Describe twitch and tetanic contractions, isotonic, and isometric contractions<br><br>Describe how posture is maintained<br><br>Explain what is meant by the phrase "muscles work in antagonistic pairs"<br><br>Describe the relationship between bones and skeletal muscles in body movement<br><br>Describe how muscles are named based on their characteristics<br><br>Demonstrate the different types of body movements<br><br>Identify the major skeletal muscles throughout the body<br><br>Use the name of the muscle to help identify and remember its location, appearance, and function |

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| | Compare the three types of muscle tissue<br><br>Describe the process of tissue repair<br><br>Describe abnormal cell division as it relates to genetic diseases and cancer<br><br>Define important terminology related to the cell | | List and describe the diseases/ disorders associated with the skeletal system<br><br>Define important terminology related to the skeletal system | Differentiate between fast and slow muscles<br><br>Describe the different classes of levers and how they make muscles more efficient<br><br>List the three different types of exercise and give examples of each<br><br>Describe the effects of aging on the muscular system<br><br>List and describe the characteristics of diseases/disorders associated with the muscular system<br><br>Define important terminology related to the muscular system |
| Activities | PowerPoint Presentations<br><br>Lab Activities | PowerPoint Presentations<br><br>**Formative Assessment:**<br>Write a paragraph that describes the layers and structures of the skin from most superficial to most deep.<br><br>Lab Activities: Skin Investigations; Microscopic Observation of Scalp Hair | PowerPoint Presentations<br><br>**Formative Assessment:**<br>Out of groups of disarticulated bones, students will identify which bone does not belong and explain why by identifying all the bones and what they all share in common. | PowerPoint Presentations<br><br>**Formative Assessment:**<br>Write a paragraph explaining the similarities and differences between smooth, skeletal, and cardiac muscle (or create a triple Venn diagram). |

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| | | Shafts; Modeling a Transdermal Patch | Lab Activities: Observing Bone Composition and Strength; Skull Analysis for Sex Determination; Pelvis Analysis for Sex Determination; | Lab Activities: Microscopic Observation of Muscle Tissues; Muscle Fatigue; Comparing Bones, Joints, and Muscles; Chicken Wing Dissection |
| Evaluation | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook |
| Resources | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos |

| Topic | Nervous System<br>(5 weeks) | Special Senses<br>(5 weeks) | Endocrine System<br>(5 weeks) |
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| NJSLS | LS1-2<br>LS1.A | LS1-2<br>LS1.A | LS1-2<br>LS1.A |
| ELA | SL.11-12.5 | SL.11-12.5 | SL.11-12.5 |
| Technology Ed. | 8.1.12.DA.1,5 | 8.1.12.DA.1,5 | 8.1.12.DA.1,5 |

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| 21st Century Knowledge & Skills | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 | 9.4.12.CI.1<br>9.4.12.CT.2,4<br>9.4.12.IML.2,3,8<br>9.4.12.TL.1,3,4 |
| Skills (SWBAT) | Distinguish between the central and peripheral nervous systems and describe the function of each subdivisions<br><br>List and describe the three basic functions of the nervous system<br><br>Distinguish between neurons and neuroglial cells and describe the functions of each<br><br>Distinguish between myelinated and unmyelinated nerve fibers<br><br>Describe the events that lead to the generation of a nerve impulse and its conduction from one neuron to another<br><br>Explain the mechanism of synaptic transmission and describe the types and effects of the most important neurotransmitter<br><br>Define a reflex arc and describe the function of each part | List the five groups of sensory receptors and describe the functions of each<br><br>Explain how receptors stimulate sensory impulses<br><br>Describe how a sensation is produced<br><br>Differentiate between somatic and special senses<br><br>Describe the integration of sensory input and motor output<br><br>Describe how a stimulus is converted into a sensation<br><br>Identify and describe the accessory structures of the eye and the major parts of the eye<br><br>Identify, describe and state the functions of the parts of the ear<br><br>Describe the interrelationship between the sense of smell and the sense of test<br><br>List the seven olfactory sensations | Identify the functions of the endocrine system<br><br>On a diagram, identify all of the glands and tissues that make up the endocrine system and list the hormones they secrete<br><br>Differentiate between endocrine and exocrine glands<br><br>Compare the four chemical classes of hormones<br><br>Describe how hormones are transported in the blood and how they interact with target cell receptors<br><br>Explain how the secretion of each hormone is regulated<br><br>Describe the negative feedback system and how it regulates hormonal secretions and give two examples<br><br>Explain the role of the nervous system in control of the hormonal secretions<br><br>Discuss ways hormones promote body homeostasis |

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| | Distinguish between sensory, motor, and mixed nerves<br><br>List at least four types of sensory receptors and describe the functions of each<br><br>Explain how a nerve impulse passes from one neuron to another<br><br>Identify the principal parts of the brain and describe the functions of each<br><br>Identify the layers of the meninges, and describe their functions<br><br>Describe the formation of the cerebral spinal fluid and blood brain barrier<br><br>Describe the structure of the spinal cord<br><br>List the major parts of the peripheral nervous system<br><br>Name the cranial nerves and list their major functions<br><br>Describe the structure and function of the spinal nerves | Name the four basic taste sensations and describe the patterns in which the receptors are distributed on the tongue<br><br>Trace the pathway through which light passes as it travels from cornea to the retina<br><br>Trace the pathway of sound vibrations from the eardrum to the hearing receptors<br><br>Differentiate between static and dynamic equilibrium and describe the organs of each<br><br>List and describe diseases/disorders associated with the special senses<br><br>Define important terminology related to the special senses | Describe the effect of stress on the endocrine system<br><br>Describe the major pathologic consequences of hypersecretion and hyposecretion of endocrine hormones<br><br>Define important terminology related to the endocrine system |

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| | Distinguish between the parasympathetic and the sympathetic divisions of the autonomic nervous system<br><br>Define related terminology of the nervous system | | |
| Activities | PowerPoint Presentations<br><br>**Formative Assessment:**<br>Draw and label or write out the 5 steps of the reflex arc;<br><br>Lab Activities: Observing Nervous Responses; Sheep Brain Dissection; | PowerPoint Presentations<br><br>**Formative Assessment:**<br>Using the Motic microscope (a microscope that can be attached to the computer), create a presentation on one of the special senses (vision or taste). Incorporate 5 microscopic slides and the use of the microscope during the presentation<br><br>Lab Activities: Cow Eye Dissection; Vision Experiments; Hearing Lab; Taste Test Lab | PowerPoint Presentations<br><br>Lab Activities |
| Evaluation | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook | Class Participation<br>Homework<br>Lab activities<br>Tests<br>Quizzes<br>Notebook |
| Resources | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos | *The Human Body in Health and Disease*<br>Power point<br>Worksheets<br>Lab materials<br>Notes<br>Videos |