Passaic County Technical Institute

Wayne, NJ

Anatomy and Physiology I Curriculum

August 2015

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I. Course Description

Anatomy and Physiology I is designed primarily for students intending to pursue a career in the health and science industry in general, though it is open to any interested student. Anatomy and Physiology I is the first part of the two-year sequence of the college-level coursework taught under the supervision and according to guidelines stipulated by UMDNJ. This course will focus on basic principles of human body structure, functions, and foundations of pathology. Students will also learn and master practical laboratory skills that can prove to be useful for future employment with clinical and research institutions. Successful completion of General Biology and completion or parallel enrollment in Chemistry are required for taking Anatomy and Physiology I. In Anatomy and Physiology I the major focus is on correlation of form and function, beginning at the molecular level and eventually leading to the level of selected organ systems such as: integumentary, skeletal, muscular, and nervous. Normal physiology of the listed systems is studied with pathological highlights. The course also includes the comprehensive study of normal histology. Anatomy and Physiology I includes a required laboratory component. In the laboratory setting, students will examine basic principles of physiology; master macro- and microscopic techniques of tissue identification; examine the skeletal system and joints; perform dissections on assorted species in order to compare and contrast superficial and deep musculature, and structures of the eye and brain with that of human anatomy. Students who have successfully passed the first year of Anatomy and Physiology will be able to continue the study of the human body systems in Anatomy and Physiology II.

II. Course Objectives/Outline

Content Area:	Anatomy and Physiology I		Grade(s)	10-12
Unit Plan Title:	Introduction to the subject of Anatomy and Physiology	Time Frame	4 Weeks	
Learning Objectives				
1. Explain the subjects of study of anatomy and physiology and essential methods of studying the form and functions of human body. (LS1.A) 2. List and identify the areas of study and application of closely related disciplines.				

3. Identify six levels of organization in human body. (LS1.A)
4. Define and explain the functions of four major types of tissues. (LS1.A)
5. List and explain the functions of organ systems. (LS1.A)
6. Define characteristics of life and correlate them to clinical vital signs. (LS1.A)
7. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)**
8. List noninvasive techniques for examining human body and identify appropriate cases of use for each.
9. Define anatomical position. (LS1.A)
10. Define and apply anatomical directional and regional terminology including plain and sections, body parts, and body cavities.
11. Define location, contents, type of membrane lining and layers of main body cavities. (LS1.A)
12. Evaluate clinical importance of division of abdominopelvic cavity into9 regions and 4 quadrants. (LS1.A)
13. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models (pp. 56-59. NRC, 2012) • Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) **Planning and Carrying Out Investigations** (pp. 59-61, NRC, 2012) • Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical	**LS1.A: Structure and Function** (pp. 143-145, NRC, 2012) • Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) • All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) *(Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)* • 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. (HS-LS1-2) • Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback	**Systems and System Models** (pp. 91-94, NRC, 2012) • Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2) **Structure and Function** (pp. 96-98, NRC, 2012) • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) **Stability and Change** (pp. 98-101, NRC, 2012) • Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)

models. • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3) **Constructing Explanations and Designing Solutions** (pp. 67-71, NRC, 2012) • Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-1)	mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)	
Common Core		
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Content Area:	Anatomy and Physiology I		Grade(s)	10-12
Unit Plan Title:	Chemistry of Life	Time Frame	4 Weeks	

Learning Objectives

1. Define states of matter in relation to human organism.
2. List major, minor, and trace elements in human body and their functions. (LS1.A)
3. Define and explain atomic structure, concept of valence, ions, molecules, free radical, electrolytes, and isotopes in relation to human physiological processes. (LS1.A)
4. Explain creation of chemical bonds and their significance in functions of biological molecules. (LS1.A)
5. Define and be able to write and read the equations of basic chemical reactions.
6. Identify solutions, suspensions, and colloids in the body. (LS1.A)
7. Identify pH of body fluids and mechanisms and consequences of pH shifts. (LS1.A)
8. Differentiate between organic and inorganic compounds.
9. Define properties of carbon atom. (LS1.A)
10. Define chemical structure, types, and functions of carbohydrates. (LS1.A)
11. Define chemical structure, types and functions of lipids, lipoproteins, prostaglandins, fat-soluble vitamins. (LS1.A)
12. Differentiate between saturated and unsaturated fats, cis- and trans-forms, effect of hydrogenation on properties and metabolism of lipids. (LS1.A)
13. Define chemical nature, levels of structure, types and functions of proteins. (LS1.A)
14. Explain the process of denaturing of proteins and factors causing denaturing. (LS1.A)
15. Define properties and functions of enzymes and explain the mechanism of enzyme action using the key-and-lock concept.
16. Define the structure and functions of nucleic acids and ATP as a nucleotide. (LS1.A)
17. Explain the mechanisms and purpose of reactions of dehydration synthesis and hydrolysis. (LS1.A)
18. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)**
19. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models (pp. 56-59. NRC, 2012)	**LS1.A: Structure and Function** (pp. 143-145, NRC,	**Systems and System Models** (pp. 91-94, NRC, 2012) • Models (e.g., physical, mathematical,

• Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) **Planning and Carrying Out Investigations** (pp. 59-61, NRC, 2012) • Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3) **Constructing Explanations and Designing Solutions** (pp. 67-71, NRC, 2012) • Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent	2012) • Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) • All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) *(Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)* • 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. (HS-LS1-2) • Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)	computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2) **Structure and Function** (pp. 96-98, NRC, 2012) • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) **Stability and Change** (pp. 98-101, NRC, 2012) • Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)

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Common Core

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Content Area:	Anatomy and Physiology I		Grade(s)	10-12
Unit Plan Title:	Cellular Structures, Cell Membrane and Transport	Time Frame	4 Weeks	

Learning Objectives

1. Identify the structures of a typical cell and their major functions. (LS1.A)
2. Explain with examples how the composition and number of organelles corresponds with the specialization of a cell. (LS1.A)
3. Define structural composition of a plasma membrane and correlate the structures to the functions performed. (LS1.A)
4. Define and apply concepts of selective permeability and fluidity. (LS1.A)
5. Define and differentiate between passive and active transport across the membrane. (LS1.A)
6. Define factors affecting diffusion through membrane. (LS1.A)
7. Differentiate between mechanisms of simple diffusion, facilitated diffusion, and osmosis and give examples of substances that are transported by each of these processes. (LS1.A)
8. Explain the concept of tonicity and predict the effects of isotonic, hypertonic, and hypotonic solutions on human cells and overall

homeostasis. (LS1.A)

9. Differentiate between primary active transport, secondary active transport, and transport and vesicles and give examples of physiological functions dependent on these processes. (LS1.A)
10. Explain in detail the mechanism of receptor-mediated endocytosis, phagocytosis, pinocytosis, exocytosis, and transcytosis. (LS1.A)
11. Explain the principle and purpose of dialysis for patients with kidney failure. (LS1.A)
12. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)**
13. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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Content Area:	Anatomy and Physiology I		Grade(s)	10-12
Unit Plan Title:	Cell Physiology	Time	2 Weeks	

		Frame	

Learning Objectives

1. Differentiate between somatic and germ cells, homologous chromosomes and sister chromatids; chromatin and chromosomes. (LS1.A)
2. Describe in detail the phases, events and relative timing of cell cycle. (LS1.A)
3. Describe the mechanisms of control and regulation of cell cycle. (LS1.A)
4. Define the differences between apoptosis and necrosis. (LS1.A)
5. Evaluate the current theories of cells aging. (LS1.A)
6. Describe and identify pathologies of cell division, such as, anaplasia, atrophy, dysplasia, hyperplasia, metaplasia, neoplasia. (LS1.A)
7. Differentiate between benign and malignant neoplasms. (LS1.A)
8. Describe characteristics of cancerous tumors and differentiate between different types of cancer. (LS1.A)
9. Describe the differences between spermatogenesis and oogenesis. (LS1.A)
10. Describe phases and events of meiosis. (LS1.A)
11. Explain the significance of data on human genome and proteome for clinical practice. (LS1.A)
12. **Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life though systems. (HS-LS1-1)**
13. Describe energy generation by means of aerobic and anaerobic cellular respiration including sites, materials, products and purpose of each step. (LS1.A)
14. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2**)
15. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3**)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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Content Area:	Anatomy and Physiology I		Grade(s)	10-12
Unit Plan Title:	Tissue	Time Frame	3 Weeks	

Learning Objectives

1. Describe stages of embryonic development. (LS1.A)
2. Define three germ layers and types of tissues originating from each. (LS1.A)
3. Describe four types of cell junctions and give examples of tissues in which the cells are connected with each type of junction. (LS1.A)
4. Describe major types of epithelial tissue and correlate the structure with function and location in the body. (LS1.A)
5. Describe glands and classify them by function. (LS1.A)
6. Describe major types of connective tissue including cellular and non-cellular components, functions, and locations. (LS1.A)
7. Describe muscular tissue including structure, functions, and locations. (LS1.A)
8. Describe nervous tissue including major and supportive components, functions, and locations. (LS1.A)
9. Using microscope, identify the tissue presented on unlabeled slide and predict the body location from which the slide was made. (LS1.A)
10. Describe the processes of tissue regeneration and repair for each tissue type. (LS1.A)
11. Describe in detail the phases and events of wound healing involving epithelial and connective tissues. (LS1.A)
12. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)**
13. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
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Content Area:	Anatomy and Physiology I		Grade(s)	10-12
Unit Plan Title:	Integumentary System	Time Frame	2 Weeks	

Learning Objectives

1. Describe cells found in epidermis and their functions; define composition and functions of epidermal strata. (LS1.A)
2. Describe composition of dermal regions and their functions. (LS1.A)
3. Describe structure and function of hypodermis. (LS1.A)
4. Define structure and function of epidermal ridges. (LS1.A)
5. Identify pigments responsible for the skin color and cells producing the pigments.

6. Explain the use of skin color as a diagnostic clue for identifying health conditions. (LS1.A)
7. Describe the structures and functions of hair and the hair growth cycle. (LS1.A)
8. Describe the structures and functions of nails. (LS1.A)
9. Describe the functions and structure and identify as merocrine, apocrine, or holocrine, sebaceous, ceruminous, and sweat glands. (LS1.A)
10. Differentiate between thick and thin skin. (LS1.A)
11. Correlate the structures of the skin with its six major functions. (LS1.A)
12. Describe types of skin cancers and explains signs to be watched in development of malignant melanomas. (LS1.A)
13. Describe the characteristics of burns of different degrees and their local and systemic effects; explain the use of the rule of nine. (LS1.A)
14. Describe causes, characteristics and prevention of pressure ulcers and dermatitis of various natures. (LS1.A)
15. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)**
16. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models (pp. 56-59. NRC, 2012) • Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) **Planning and Carrying Out Investigations** (pp. 59-61, NRC, 2012) • Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual,	**LS1.A: Structure and Function** (pp. 143-145, NRC, 2012) • Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) • All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) *(Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)* • 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. (HS-LS1-2) • Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions	**Systems and System Models** (pp. 91-94, NRC, 2012) • Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2) **Structure and Function** (pp. 96-98, NRC, 2012) • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) **Stability and Change** (pp. 98-101, NRC, 2012) • Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)

mathematical, physical, and empirical models. • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3) **Constructing Explanations and Designing Solutions** (pp. 67-71, NRC, 2012) • Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-1)	change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)	

Common Core

WHST.11-12.1.A, WHST.11-12.1.B, WHST.11-12.1.C, WHST.11-12.1.D, WHST.11-12.1.E, WHST.11-12.2, WHST.11-12.2.A, WHST.11-12.2.B, WHST.11-12.2.C, WHST.11-12.2.D, WHST.11-12.2.E, WHST.11-12.4, WHST.11-12.5, WHST.11-12.6, WHST.11-12.7, WHST.11-12.8, WHST.11-12.9, WHST.11-12.10, RST.11-12.1, RST.11-12.2, RST.11-12.3, RST.11-12.4, RST.11-12.5, RST.11-12.6, RST.11-12.7, RST.11-12.8, RST.11-12.9

Content Area:	Anatomy and Physiology I		Grade(s)	10-12
Unit Plan Title:	Bone Structure and Function	Time Frame	4 Weeks	

Learning Objectives

1. Define the division of skeletal system into axial and appendicular skeletons. (LS1.A)
2. Define functions of bones. (LS1.A)
3. Describe characteristics, functions and locations of spongy and compact bone tissue. (LS1.A)
4. Classify bones by shape. (LS1.A)
5. Identify parts of a generalized long bone. (LS1.A)
6. Describe composition of a bone matrix and identify the cells in osseous tissue. (LS1.A)
7. Describe and apply on practice nomenclature of bone markings.
8. Describe the process of intramembranous and endochondral ossification in an embryo. (LS1.A)
9. Describe the process of bone growth after birth. (LS1.A)
10. Describe the events of bone remodeling. (LS1.A)
11. Distinguish major types of bone fractures.
12. Describe steps and events of fracture repair. (LS1.A)
13. Define factors affecting bones growth and repair. (LS1.A)
14. Describe regulation of calcium deposition and release from bones. (LS1.A)
15. Describe causes, symptoms, and treatment of major bone pathological conditions, such as osteoporosis and rickets. (LS1.A)
16. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)**
17. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models (pp. 56-59. NRC, 2012) • Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their	**LS1.A: Structure and Function** (pp. 143-145, NRC, 2012) • Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) • All cells contain genetic information in the form	**Systems and System Models** (pp. 91-94, NRC, 2012) • Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2)

components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) **Planning and Carrying Out Investigations** (pp. 59-61, NRC, 2012) • Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3) **Constructing Explanations and Designing Solutions** (pp. 67-71, NRC, 2012) • Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories,	of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) *(Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)* • 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. (HS-LS1-2) • Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)	**Structure and Function** (pp. 96-98, NRC, 2012) • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) **Stability and Change** (pp. 98-101, NRC, 2012) • Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)

simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-1)		

Common Core

WHST.11-12.1.A, WHST.11-12.1.B, WHST.11-12.1.C, WHST.11-12.1.D, WHST.11-12.1.E, WHST.11-12.2, WHST.11-12.2.A, WHST.11-12.2.B, WHST.11-12.2.C, WHST.11-12.2.D, WHST.11-12.2.E, WHST.11-12.4, WHST.11-12.5, WHST.11-12.6, WHST.11-12.7, WHST.11-12.8, WHST.11-12.9, WHST.11-12.10, RST.11-12.1, RST.11-12.2, RST.11-12.3, RST.11-12.4, RST.11-12.5, RST.11-12.6, RST.11-12.7, RST.11-12.8, RST.11-12.9

Content Area:	Anatomy and Physiology I		Grade(s)	10-12
Unit Plan Title:	Axial & Appendicular Skeleton and Joints	Time Frame	4 Weeks	

Learning Objectives

1. Identify bones comprising axial skeleton. (LS1.A)
2. Locate, name and identify the functions and major bone markings of the cranial bones. (LS1.A)
3. Locate and identify major structures of the adult and fetal skull. (LS1.A)
4. Locate, name, and identify the functions and major markings of the facial bones. (LS1.A)
5. Describe pathologies of the skull development. (LS1.A)
6. Define location and functions of hyoid bone. (LS1.A)
7. Define regions of vertebral column and normal and abnormal primary and secondary spinal curves. (LS1.A)
8. Describe structure and functions of intervertebral discs. (LS1.A)
9. Describe parts of a typical vertebra and their functions. (LS1.A)
10. Identify vertebrae from different regions of the spinal column based on their unique characteristics. (LS1.A)
11. Describe bones comprising the thoracic cage; identify major bone markings and their functions. (LS1.A)
12. Describe bones of the shoulder girdle; identify major markings and functions. (LS1.A)
13. Describe bones comprising the upper limb, their markings and functions. (LS1.A)
14. Describe bones comprising the pelvic girdle, their markings and functions. (LS1.A)
15. Describe bones of the lower limb, their markings and functions. (LS1.A)

16. Describe and explain the importance of the arches in the foot. (LS1.A)
17. Classify joints based on structural and functional characteristics. (LS1.A)
18. Describe the structure and functions of each part of a typical synovial joint. (LS1.A)
19. Classify synovial joints by mechanics of movement. (LS1.A)
20. Describe causes, symptoms, and possible treatments for major pathological conditions of joints (arthritis, sprain, strain, gout). (LS1.A)
21. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)**
22. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models (pp. 56-59. NRC, 2012) • Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) **Planning and Carrying Out Investigations** (pp. 59-61, NRC, 2012) • Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for	**LS1.A: Structure and Function** (pp. 143-145, NRC, 2012) • Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) • All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) *(Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)* • 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. (HS-LS1-2) • Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)	**Systems and System Models** (pp. 91-94, NRC, 2012) • Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2) **Structure and Function** (pp. 96-98, NRC, 2012) • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) **Stability and Change** (pp. 98-101, NRC, 2012) • Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)

evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3) **Constructing Explanations and Designing Solutions** (pp. 67-71, NRC, 2012) • Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-1)		

Common Core
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Content Area:	Anatomy and Physiology I	Grade(s)	10-12

Unit Plan Title:	Muscles	Time Frame	4 Weeks

Learning Objectives

1. Define four essential functions and four properties of the muscle tissue. (LS1.A)
2. Differentiate between connective tissue components of muscles. (LS1.A)
3. Describe microscopic components of a muscle fiber. (LS1.A)
4. Identify protein molecules composing a myofibril and playing a role in contractions. (LS1.A)
5. Describe the events of action potential initiation and propagation along a muscle fiber. (LS1.A)
6. Describe mechanism of muscle contraction and explain the role of calcium ions, ATP, and regulatory and motor proteins in contractions. (LS1.A)
7. Define factors affecting muscle contractions. (LS1.A)
8. Classify muscle contractions as isotonic or isometric.
9. Describe metabolic pathways of energy generation in muscle tissue and causes of muscle fatigue. (LS1.A)
10. Describe microscopic structures and physiological differences in action of smooth muscles. (LS1.A)
11. Distinguish between contraction regulation mechanisms in skeletal, smooth, and cardiac muscles. (LS1.A)
12. Describe the causes, symptoms, and treatments of major disorders of the muscular system, such as injury, infections, dystrophy, myasthenia gravis, and hernias. (LS1.A)
13. Define the principles of naming the skeletal muscles.
14. Define five principles of muscle activity. (LS1.A)
15. Classify muscles based on function (agonist, antagonist, synergist, and fixator) and fascicle arrangement. (LS1.A)
16. Locate, name, describe the functions, and identify placements of origins and insertions of the major skeletal muscles. (LS1.A)
17. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)**
18. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models (pp. 56-59. NRC, 2012) • Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among	**LS1.A: Structure and Function** (pp. 143-145, NRC, 2012) • Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) • All cells contain genetic information in the form	**Systems and System Models** (pp. 91-94, NRC, 2012) • Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-

variables between systems and their components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) **Planning and Carrying Out Investigations** (pp. 59-61, NRC, 2012) • Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3) **Constructing Explanations and Designing Solutions** (pp. 67-71, NRC, 2012) • Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Construct an explanation based on valid and reliable evidence obtained from a	of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) *(Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)* • 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. (HS-LS1-2) • Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)	2) **Structure and Function** (pp. 96-98, NRC, 2012) • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) **Stability and Change** (pp. 98-101, NRC, 2012) • Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)

variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-1)		

Common Core

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Content Area:	Anatomy and Physiology I		Grade(s)	10-12
Unit Plan Title:	Nervous System	Time Frame	3 Weeks	

Learning Objectives

1. Define the functions of nervous system. (LS1.A)
2. Describe the functional organization of nervous system. (LS1.A)
3. Describe the anatomy of a neuron and classify neurons by structure and functions. (LS1.A)
4. Describe types of functions of neuroglia in CNS and PNS. (LS1.A)
5. Describe mechanisms of induction and propagation of resting potential, grading potential, and action potential. (LS1.A)
6. Differentiate between continuous and salutatory conduction and explain all-or-none principle. (LS1.A)
7. Describe the functions of selected neurotransmitters in function of synapses. (LS1.A)
8. Describe neural circuits and reflex arc parts. (LS1.A)
9. Describe the mechanisms of stretch reflex, tendon reflex, flexor and crossed extensor reflex, and pupil reflex. (LS1.A)
10. Describe the structure of a nerve. (LS1.A)
11. Describe protective barriers and their functions in CNS. (LS1.A)
12. Describe procedures and use of epidural anesthesia and spinal tap.
13. Describe internal and external structures of the spinal cord. (LS1.A)

14. Describe nerve impulse pathway in spinal cord. (LS1.A)
15. Describe locations and functions of the major spinal nerves and plexuses. (LS1.A)
16. Describe general anatomical organization of the brain and the functions of brain stem, cerebellum, diencephalon, and cerebrum.
17. Describe structures and functions of parts of cerebral cortex. (LS1.A)
18. Locate, name, and identify functions of 12 pairs of cranial nerves. (LS1.A)
19. Describe the composition and functions of autonomic nervous system. (LS1.A)
20. Describe causes, symptoms, and treatments of brain tumors, cerebrovascular accidents, and multiple sclerosis. (LS1.A)
21. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)**
22. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models (pp. 56-59. NRC, 2012) • Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) **Planning and Carrying Out Investigations** (pp. 59-61, NRC, 2012) • Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. • Plan and conduct an investigation individually and collaboratively to produce	**LS1.A: Structure and Function** (pp. 143-145, NRC, 2012) • Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) • All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) *(Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)* • 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. (HS-LS1-2) • Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback)	**Systems and System Models** (pp. 91-94, NRC, 2012) • Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2) **Structure and Function** (pp. 96-98, NRC, 2012) • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) **Stability and Change** (pp. 98-101, NRC, 2012) • Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)

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Common Core
WHST.11-12.1.A, WHST.11-12.1.B, WHST.11-12.1.C, WHST.11-12.1.D, WHST.11-12.1.E, WHST.11-12.2, WHST.11-12.2.A, WHST.11-12.2.B, WHST.11-12.2.C, WHST.11-12.2.D, WHST.11-12.2.E, WHST.11-12.4, WHST.11-12.5, WHST.11-12.6, WHST.11-12.7, WHST.11-12.8, WHST.11-12.9, WHST.11-12.10, RST.11-12.1, RST.11-12.2, RST.11-12.3, RST.11-12.4, RST.11-12.5, RST.11-12.6, RST.11-12.7, RST.11-12.8, RST.11-12.9

Content Area:	Anatomy and Physiology I	Grade(s)	10-12

Unit Plan Title:	Somatic and Special Senses	Time Frame	2 Weeks

Learning Objectives

1. Distinguish between somatic and special senses. (LS1.A)
2. Describe five kinds of receptor and their functions. (LS1.A)
3. Describe the events involved in sensation feeling. (LS1.A)
4. Describe structure of receptors associated with touch, pressure, temperature, and pain. (LS1.A)
5. Describe the structures and functions of olfactory receptors. (LS1.A)
6. Describe the structures and functions of gustatory receptors. (LS1.A)
7. Describe structures of the ear and structures and functions of receptors involved in hearing and equilibrium. (LS1.A)
8. Describe the structures and functions of the eye and mechanisms of light refraction through the eye media. (LS1.A)
9. Describe the receptors and nerve pathways associated with vision. (LS1.A)
10. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)**
11. **Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)**

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models (pp. 56-59. NRC, 2012) • Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) **Planning and Carrying Out Investigations** (pp.	**LS1.A: Structure and Function** (pp. 143-145, NRC, 2012) • Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) • All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) *(Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)* • Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a	**Systems and System Models** (pp. 91-94, NRC, 2012) • Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2) **Structure and Function** (pp. 96-98, NRC, 2012) • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1)

59-61, NRC, 2012) • Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3) **Constructing Explanations and Designing Solutions** (pp. 67-71, NRC, 2012) • Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-1)	component of the next level. (HS-LS1-2) • Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)	**Stability and Change** (pp. 98-101, NRC, 2012) • Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3)

Common Core
WHST.11-12.1.A, WHST.11-12.1.B, WHST.11-12.1.C, WHST.11-12.1.D, WHST.11-12.1.E, WHST.11-12.2, WHST.11-12.2.A, WHST.11-12.2.B, WHST.11-12.2.C, WHST.11-12.2.D, WHST.11-12.2.E, WHST.11-12.4, WHST.11-12.5, WHST.11-12.6, WHST.11-12.7, WHST.11-12.8, WHST.11-12.9, WHST.11-12.10, RST.11-12.1, RST.11-12.2, RST.11-12.3, RST.11-12.4, RST.11-12.5, RST.11-12.6, RST.11-12.7, RST.11-12.8, RST.11-12.9

III. Methods of Student Evaluation

Assessment can be divided into two general categories: formal (graded) and informal/classroom-based (both graded and ungraded). The key to effectively assessing a student's mastery of skills is to match the assessment method to the learning objective.

Formal Assessments

- Evaluation
- Class participation
- Creative assignments
- Homework and classwork assignments
- Reports and presentations
- Research methodology
- Technological applications
- Unit tests
- Various speaking and listening assignments
- Multiple choice exams
- Quizzes (announced and unannounced)
- Essays
- Formal lab reports
- Scientific journal reviews
- Projects
- Short answer and problem solving tests

- Tests and quizzes on blackboard
- Case Study analysis

Informal Assessments

- Instructor's observations of note-taking, and organization of notebooks and assignments
- Cooperative learning activities, including labs
- Creative project assignments
- Laboratory behavior
- Observing citizenship and appropriate social responses
- Instructor's observations of time management skills

Mastering of the core proficiencies of Biology shall be evaluated in accordance with the general grading policies as listed in the student handbook:

- Tests – 40%
- Laboratory Reports and Projects – 20%
- Quizzes – 20%
- Class Participation – 10%

IV. Instructional Strategies Based on Instructional Goals

- Graphs and other visuals
- Engaging in discussions
- Reading silently and aloud
- Listening and speaking activities
- Watching and responding to media
- Brainstorming
- Listening
- Mapping
- Revising and editing

- Participating in small and large groups
- Researching to make connections to texts and classroom discussions
- Collaborative projects
- Answering questions (oral and written)
- Summarizing
- Debating
- Analyzing texts, discussions, etc.
- Peer teaching
- Competing in teams/debating
- Playing games
- Creating games
- Note taking and note making
- Writing

V. Scope and Sequence

Key: I – Introduced, D-developed in Depth, R-Reinforced

Skill/Concepts to be Learned	10	11	12
Using appropriate terminology of anatomy and physiology to describe levels of structural organization and homeostasis.	IDR	IDR	IDR
Use technology to present the design and results of scientific investigation.	IDR	IDR	IDR
Comparing and contrasting normal and abnormal characteristics of the structures and functions of body systems.	IDR	IDR	IDR
Evaluate conclusions, problem solve using a case study approach the study of anatomy and physiology of the body systems.	IDR	IDR	IDR
Utilize laboratory techniques to measure data and apply to a clinical analysis of anatomy and physiology experiments.	IDR	IDR	IDR

Develop an analytical approach to the study of the regulation of body systems by understanding complex control of biological feedback mechanisms.	IDR	IDR	IDR
Apply practical information learned in anatomy and physiology to prepare for future college and career experiences.	IDR	IDR	IDR

VI. Pacing Chart

Marking Period 1

- **Unit 1**
  - **Introduction to the Subject of Anatomy and Physiology** (4 Weeks): Students will be able to identify the subjects of studies of Anatomy and Physiology, identifying the levels of organization, characteristics of living human organism, importance of maintaining of homeostasis, exploring noninvasive methods of examining the human body, learning basic anatomical terminology and identifying body cavities and membranes.
- **Unit 2**
  - **Chemistry of Life** (4 Weeks): Students will be able to identify the organization of matter in the human body, significance of energy and chemical reactions and the importance of carbon, carbohydrates, lipids, proteins, enzymes, and nucleic acids.
- **Unit 3**
  - **Cellular Structures, Cell Membrane and Transport** (4 Weeks): Students will be able to list and describe the major cell structures, discuss the importance of the plasma membrane and distinguish the importance and differences between passive transport and active transport.
- **Unit 4**
  - **Cell Physiology** (2 Weeks): Students will be able to describe the cell cycle, explain the control of cell destiny and how cell reproduce, the importance of protein synthesis in this cell reproduction, and the importance of cellular respiration in the production of cellular energy.

Marking Period 2

- **Unit 5.**
  - **Tissues** (3 Weeks): Students will be able to identify types and origin of tissues, classify various types of epithelial tissues, glands, connective tissues, muscle tissues and nervous tissues, as well as the components of body membranes and the steps in tissue regeneration.
- **Unit 6**
  - **The integumentary system** (2 Weeks): Students will be able to list and describe the structures of the skin, determinants of skin color, structure and function of skin, hair and nails, important functions of the skin, and pathophysiology of the integumentary system.
- **Unit 7**
  - **Bone Structure and Function** (4 Weeks): Students will be able to classify and determine the functions of bones, explore the histology of bony tissue, identify surface and bone markings, describe the steps in the formation of bones, importance of remodeling and repair, and list the different types of bone fractures.

Marking Period 3

- **Unit 8**
  - **Axial Skeleton & Appendicular Skeleton** (4 Weeks): Students will be able to identify the bonny structures of the skull, cranial bones, facial bones, vertebral column, thorax, shoulder girdle and upper limb, pelvic girdle and lower limb, joints as well as types of movements at the joints.
- **Unit 9**
  - **Muscles** (4 Weeks): Students will be able to identify the anatomy of gross and microscopic muscle, explain the physiology of skeletal tissue, examine the similarities and differences of cardiac and smooth muscle when compared to skeletal muscle, and list the different types of muscle movements. *Includes extended time for dissection and preparation of superficial and deep skeletal muscles of a cat.*

Marking Period 4

- **Unit 10**
  - **Nervous System** (3 Weeks): Students will be able to identify the structure and organization of the nervous system by examining nerve physiology, neural circuits and pathways, spinal cord and spinal nerves,

organization of the brain, physiology of the cerebral cortex, cranial nerves and the autonomic nervous system. *Includes dissection of the brain (sheep or beef).*

- **Unit 11**
  - **Somatic and Special Senses** (2 Weeks): Students will be able to explain human sensations and sensory receptors and how they relate to our 5 special senses. *Includes dissection of the eye (beef).*

VII. Proficiencies

Upon successful completion of this course, students will be able to:

1. Use appropriate terminology to describe anatomical structures and physiological processes in the human body.
2. Identify and correlate microscopic cell structure with the functions of the cells in different tissues.
3. Describe in detail metabolic pathways and their regulation and control.
4. Identify and locate gross structures of integumentary, skeletal, muscular, and nervous systems.
5. Identify and appropriately classify tissues under the microscope.
6. Describe in detail normal physiological processes in integumentary, skeletal, muscular, and nervous systems at various levels of organization beginning with the biochemical level.
7. Describe in detail processes of tissue and organs formation, growth, and repair.
8. Identify and explain effects of various pathological conditions of above listed systems as disruption of homeostasis.