Curriculum Development Course at a Glance
Planning for Each Grade Level

Content Area	Anatomy and Physiology	**Grade Level**	12
Course Name/Course Code	Advanced Placement Anatomy and Physiology		

Standard	**Grade Level Expectations (GLE)**	**GLE Code**
3.3 Biological Sciences		
3.3.12A	Explain the relationship between structure and function at all levels of organization. Explain and analyze the relationship between structure and function at the molecular, cellular and organ system level.	
3.3.12B	Analyze the chemical and structural basis of living organisms. • Identify and describe factors affecting metabolic function (e.g., temperature, acidity, hormones). • Evaluate metabolic activities using experimental knowledge of enzymes. • Evaluate relationships between structure and functions of different anatomical parts given their structure. • Describe potential impact of genome research on the biochemistry and physiology of life.	
3.3.12C	Explain gene inheritance and expression at the molecular level. • Analyze gene expression at the molecular level. • Describe the roles of nucleic acids in cellular reproduction and protein synthesis. • Describe genetic engineering techniques, applications and impacts. • Explain birth defects from the standpoint of embryological development and/or changes in genetic makeup.	
3.3.12D	Analyze the theory of evolution. Examine human history by describing the progression from early hominids to modern humans.	

Evergreen Community Charter School	Test book in use: Marieb EN. 2015. Essentials of human anatomy and physiology, 11th ed. NY: Pearson.

Unit Titles	**Length of Unit/Contact Hours**	**Unit Number/Sequence**
Introduction to the human body, tissues, skin and membranes	First quarter	1
Skeletal system, muscular system, nervous system, special senses	Second quarter	2
Endocrine, blood, cardiovascular system, lymphatic system	Third quarter	3
Respiratory, digestive, urinary, and reproductive system	Fourth quarter	4

Curriculum Development Overview
Planning for Each Unit

Unit Title	Introduction to the human body, tissues, skin and membranes	**Length of Unit**	First Quarter
Inquiry Questions (Engaging-Debatable):	• What is the organizational structure of the human body? • How do cells function, generate energy and reproduce? • What are the macromolecules and what roles do they play? • What is homeostasis and how does the body respond to stress? • What are the differences between tissues organs and organ systems?		
Unit Strands	Levels of structural organization (chemical level – cellular – tissue – organ-organ system- organ) Homeostasis (how do we maintain our body temperature?) The chemistry of life, pH values Macromolecules of the human body (proteins, lipids, carbohydrates, nucleic acids) Cells are the basic unit of life. A combination of cells makes up the tissue of the human body		

Generalizations **My students will Understand that…**	**Guiding Questions** **Factual**	**Conceptual**
To sustain life, the organism must be able to maintain boundaries, move, respond to stimuli, digest nutrients, excrete wastes. The body must maintain a constant temperature and level of hydration to maintain good function	How does the body respond when you feel cold (in winter, in a cold pool)?	How does the body generate heat? How does it move that heat throughout the body? Which areas will cool down first?
Basic chemistry enables the function of the human body	What are the four macromolecules? What functions do the perform?	How does the body acquire or produce the macromolecules? What role do enzymes play in metabolic pathways?
Cells are the functional unit of the body and can perform all of the activities necessary for life	How does the cell produce energy through glycolysis and cellular respiration? How do cells reproduce by mitosis and meiosis?	What effect does a lack of adequate oxygen have on tissues? What causes cancer and how does early diagnosis help prevent the spread to other parts of the body?
The body is covered in protective membranes and the outermost membrane is the integumentary system	What cell types make up the integumentary system? Where in the body can you find the various epithelial cells? What are the types of connective tissues?	How does a breakdown of connective tissues effect the function of various organ systems throughout the body?

Curriculum Development Overview
Planning for Each Unit

Critical Content: **My students will Know…**	**Key Skills:** **My students will be able to (Do)…**
• How the body maintains homeostasis • Three major tools used for medical imaging • Vocabulary of the human body • Difference between covalent bonds and ionic bonds • Important organelles found in the cells. • Different types of tissue responsible for function in the body • The difference between epithelial and connective tissue • Three major membranes of the body (serous, mucous, cutaneous)	• Identify organs in the body cavities • Identify structures found on a sonogram • Determine the difference between organic and inorganic compounds • Identify the important most abundant elements in the human body. • Diagram the manner in which we ingest necessary levels of nutrients such as fluorine, iodine, sodium. • Describe the function of important organelles (nucleus, mitochondria, lysosomes) • Compare and contrast the four types of tissues (epithelial, connective, muscle, nervous) • Categorize the membranes of the body • Identify the structure of the integumentary system (glands, fingernails, hair)

Critical Language: includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline. EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: *"Mark Twain exposes the hypocrisy of slavery through the use of satire."*	
A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):	
Academic Vocabulary:	Anatomy, Physiology, Homeostasis, cephalic, abdominal, cervical, thoracic, lumbar Matter, energy, molecules, compounds Nucleus, mitochondria, proteins, carbohydrates, lipids Hair, nails, skin, glands, tissues, cancer, burns
Technical Vocabulary:	Superior, inferior, ventral, dorsal, medial, lateral, proximal, distal, superficial, deep Covalent and ionic bonds, electrolytes, organic compounds Catabolic reaction, anabolic reactions, Apical surface, visceral, parietal, fluid, goblet cells.

Curriculum Development Overview
Planning for Each Unit

Unit Title	Skeletal system, muscular system, nervous system, special senses	**Length of Unit**	Second Quarter
Inquiry Questions (Engaging-Debatable):	• Why do bone injuries heal more rapidly than injuries to cartilage? • What are the movements of the body – flexion, extension, rotation • How do some muscles (antagonists) support the work of other muscles (agonists)? • How do isometric and isotonic muscle movements differ? • What metabolic activity may account for sore muscles? • How do the muscles support the body when there is an injury? • What is the effect of aging on skeletal muscles? Cardiac muscle?		
Unit Strands	Bones support and protect the body organs Muscles are essential for movement and also generate heat for an endothermic body Nervous systems is responsible for stimulation of skeletal, smooth, and cardiac muscle Special senses include eyes and vision, ears and hearing/balance, and the chemical senses of smell and taste		

Generalizations **My students will Understand that…**	**Guiding Questions** **Factual**	**Conceptual**
The skeletal system is essential to the construction of the body	What bones make up the axial skeleton? What bones make up the appendicular skeleton? What are the types of joints? How are bones formed and repaired by the body?	What types of joints are responsible for the flexing, bending and rotation of the body? Why is it important that some joints are fused and inflexible?
The skeletal system is responsible for storage of essential nutrients such as Calcium		
There are three types of muscle tissues in the body		
The nervous system is the rapid response system for the body		
The nervous system is divided into the central nervous system and the peripheral nervous system		
The Central Nervous System consists of the brain and the spinal cord		

The body senses are essential for gathering information for the central nervous system		

Critical Content: **My students will Know…**	**Key Skills:** **My students will be able to (Do)…**
• Name three functions of the skeletal system. • How to use the directional terms to describe the body in anatomical position • The factors that support bone health and the factors that contribute to bone loss • Nerves control the movement of the skeletal muscles • How nerves transmit information to the brain • How to read brain waves • How the eye works	• Identify 206 bones of the human body • Identify the most protected cavities of the body • Identify the origin and insertion of large muscles of the body • Name three sites used for intramuscular injection sites – name the muscles found at those sites. • Name the components of a reflex arc • Identify the structures of the eye and ear responsible for gathering information about the environment

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A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):	*Movement of the body relies on the integration of the nervous system with both the skeletal system and the skeletal muscle.*
Academic Vocabulary:	Bones, joints, fracture, body cavities, anatomic position Skeletal muscle, smooth muscle, cardiac (heart) muscle, tendon, ligament, muscle origin and insertion Brain, spinal cord, central nervous system, peripheral nervous system
Technical Vocabulary:	Skeleton: axial, appendicular, condyles, meatus, foramen, medullary cavity, fontanel Muscle: sliding filament model, actin, myosin, sarcomere, agonist, antagonist Nervous system: meninges, nerves, afferent, efferent

Curriculum Development Overview
Planning for Each Unit

Unit Title	Endocrine, blood, cardiovascular system, lymphatic system	**Length of Unit**	Third Quarter
Inquiry Questions (Engaging-Debatable):	• What are the differences between the endocrine and nervous systems? • How do hormones find their target organs? • What is the difference in the composition of whole blood vs plasma? • What cells are responsible for your immune response? • What do we mean by primary and secondary immune response? • What is the difference between the circulatory system and the lymphatic system? • Why do we remove local lymph nodes when removing a cancerous tumor?		
Unit Strands	Through the use of hormones, the endocrine system stimulates the long-term processes of growth, development, metabolism, reproduction, and body defense. Blood transports everything that must be carried from one place to another in the body including nutrients, gasses, and wastes. The cardiovascular system contains the heart and blood vessels which move the blood throughout the body. The lymphatic system consists of lymph vessels, lymph nodes, and other lymphoid organs on the body		

Generalizations **My students will Understand that…**	**Guiding Questions** **Factual**	**Conceptual**
The endocrine system responds to changes in homeostasis through the release of hormones		
Blood is a connective tissue responsible for moving nutrients and gasses throughout the body		
The cardiovascular system is the system of movement for the blood.		
The lymphatic system is an integral part of the immune system. It is responsible for returning water to the cardiovascular system		

Critical Content: **My students will Know…**	**Key Skills:** **My students will be able to (Do)…**

• The cardiovascular system is a one-way system with tubes and valves that is guided by the pumping of the heart muscle. • How hormones find and connect to their target organs • Why the pituitary gland is often referred to as the master gland • The harmful effects of using anabolic steroids to increase muscle mass	• Name the endocrine glands, their hormones, and their effects on the body • Describe the chemical nature of hormones • Describe the differences between blood types • Identify the formed elements of the blood • Trace the movement of blood through the heart • Identify the valves of the heart • Trace the movement of lymph fluid through the lymphatic vessels

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Academic Vocabulary:	Hormone, glands, target organs, hormone releasing cascade Red blood cells, bone marrow, white blood cells, platelets Atrium, ventricle, aorta, arteries, veins Lymph nodes, edema.
Technical Vocabulary:	Hypothalamus, pituitary gland, pineal, thyroid gland, parathyroid, adrenal, pancreas Erythrocytes, leukocytes, lymphocytes, neutrophils Mitril valve, tricuspid valve, aortic semilunar valve, pulmonary valve, systole, diastole Antigens, antibodies, immunocompetence,

Curriculum Development Overview
Planning for Each Unit

Unit Title	Respiratory, digestive, urinary, and reproductive system	**Length of Unit**	Fourth Quarter
Inquiry Questions (Engaging-Debatable):	• What is the route of air from the nose to the alveoli? • What is the major way that oxygen is transported in the blood? • What are the respiratory muscles responsible for inhalation and exhalation? • What are the most important structures for mechanical digestion? • What are the most important structures for chemical digestion in the body? • What is the purpose of dialysis? • Why is the human reproductive system inactive prior to puberty? • What is menopause?		
Unit Strands	The respiratory system leads from the nasal passages to the lungs. The digestive system is responsible for ingestion and absorption of nutrients needed to fuel and build the body The paired kidneys are retroperitoneal in the lumbar region The reproductive system consists of both primary and secondary sex characteristics.		

Generalizations **My students will Understand that…**	**Guiding Questions** **Factual**	**Conceptual**
The respiratory system is responsible for moving oxygen into the body and carbon dioxide out of the body as waste		
The digestive system takes in food, breaks it down into nutrient molecules and absorbs it into the blood stream		
The paired kidneys are responsible for maintaining water balance in the body		
There is a separate reproductive system with many different structures in the male organism and in the female organism.		

Curriculum Development Overview
Planning for Each Unit

Critical Content: **My students will Know…**	**Key Skills:** **My students will be able to (Do)…**
• The upper respiratory system consists of the nose, throat, larynx, and trachea • The lower respiratory system consists of the bronchi and the lungs • Where digestion of proteins, and carbohydrates takes place • The names of the chemical modifiers needed for lipid digestion • Gastric juices and their composition • Endocrine and exocrine function of the pancreas with regards to digestion • How fluid reach the bladder for urination • How the body maintains a homeostasis of fluids in the blood stream using the mechanisms of the urinary system • The structures that comprise the reproductive system (male and female)	• Identify the structures of the respiratory system • Describe the movement of oxygen and carbon dioxide into and out of the lungs • Describe the movement of smooth muscle responsible for moving the bolus through the esophagus • Identify the composition of the teeth • Identify the structure found in the stomach • Identify the structure of the intestine (small and large) • Identify the structures of the reproductive system • Be able to trace the movement of egg and sperm through development

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Academic Vocabulary:	Vocal cords, nose, throat, trachea, bronchi, lung Teeth, throat, esophagus, stomach, duodenum, jejunum, ilium, large intestine, rectum, anus Bladder, ureter, kidney, urethra Breast, Uterus, ovum, fetal development, penis, sperm, prostrate
Technical Vocabulary:	Epiglottis, cartilage, bronchioles, alveoli, surfactant Bolus, mechanical digestion, amylase, lipase, protease, peristalsis, pyloric sphincter Hilum, trigone, detrusor muscle, internal urethral sphincter Oogenesis, spermatogenesis, ovulation, ejaculation, mammary glands, fertilization, zygote