SUBJECT AREA – SCIENCE

COURSE TITLE:	PHYSIOLOGY
CBEDS ASSIGNMENT CODE:	2655
COURSE CODE:	S702p
GRADE LEVEL:	11-12
COURSE LENGTH:	One Year
PREREQUISITE:	Grade of “B” or better in Biology recommended and pass a physical science class prior to taking Physiology
CREDIT:	10 credits
UC/CSU CREDIT:	Meets UC/CSU elective credit requirements, “g”.
GRADUATION REQUIREMENT:	Fulfills 10 units of elective credit required for graduation.
STANDARDS AND BENCHMARKS:	Physiology: 1.0, 1.1.1-1.3.15; 2.0, 2.1.1-2.3.16; 3.0, 3.1.1-3.3.12; 4.0, 4.1.1-4.4.27; 5.0, 5.1-5.3

SUBJECT AREA – SCIENCE

COURSE DESCRIPTION: Physiology is the in-depth study of the human body, its construction and functions. Extensive laboratory experiences will focus on the application of course content to the fields of medicine, nursing, and physical fitness.

COURSE GOALS: Upon completion of the course, student will:

1. Understand the structural and functional relationships in the human body.
2. Understand homeostatic mechanisms in the human body.
3. Understand the developmental aspects of the human body system.

TEXTBOOK MATERIALS: Essentials of Anatomy & Physiology, Elaine N. Marieb, 2006.

TEACHER RESOURCES: Interactive Physiology CD
Human Anatomy & Physiology, Elaine N. Marieb, 2004.
Anatomy & Physiology Coloring Workbook, Elaine N. Marieb.

		CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
1.0	**STUDENTS WILL UNDERSTAND THE ORGANIZATION OF THE BODY.**	N/A	1.0	N/A	Quiz Test Lab Practical	25% of class time
1.1	**The Human Body**					
	1.1.1 Define *anatomy* and *physiology*.					
	1.1.2 Explain how physiology and anatomy are related.					
	Levels of structural organization					
	1.1.3 Name the levels of structural organization that make up the human body, and explain how they are related.					
	1.1.4 Name the organ systems of the body, and briefly state the major functions of each one.					
	1.1.5 Classify by organ system all organs discussed.					
	1.1.6 Identify the organs shown on a diagram or a dissectible torso.					
	Maintaining life					
	1.1.7 List functions that humans must perform to maintain life.					
	1.1.8 List the survival needs of the human body.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Homeostasis 1.1.9 Define *homeostasis* and explain its importance. 1.1.10 Define *negative feedback* and describe its role in maintaining homeostasis and normal body function. The language of anatomy 1.1.11 Describe the anatomical position or demonstrate it. 1.1.12 Use proper anatomical terminology to describe body directions surfaces and body planes. 1.1.13 Locate the major body cavities and list the chief organs in each cavity.			X		

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
1.2 Basic Chemistry Concepts of matter and energy 1.2.1 Differentiate clearly between matter and energy. 1.2.2 List the major energy forms and provide one example of how each energy form is used in the body. Composition of matter 1.2.3 Define *chemical element* and list the four elements that form the bulk of body matter. 1.2.4 Explain how elements and atoms are related. 1.2.5 List the subatomic particles and describe their relative masses, charges, and positions in the atom. 1.2.6 Define *radioisotope*, and describe briefly how radioisotopes are used in the diagnosis and treatment of disease.		Chemistry	X		

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Molecules and compounds 1.2.7 Recognize that chemical reactions involve the interaction of electrons to make and break chemical bonds. 1.2.8 Define *molecule* and explain how molecules are related to compounds. Chemical bonds and chemical reactions 1.2.9 Differentiate between ionic, polar covalent and non-polar covalent bonds and describe the importance of hydrogen bonds. 1.2.10 Contrast synthesis, decomposition, and exchange reactions.			X X		

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Biochemistry: the chemical composition of living matter					
1.2.11 Distinguish between organic and inorganic compounds.					
1.2.12 Differentiate clearly between a salt and acid and a base.			X		
1.2.13 List several salts (or their ions) vitally important to body functioning.					
1.2.14 Explain the importance of water to body homeostasis, provide examples.					
1.2.15 Explain the concept of pH and state the pH of blood.					
1.2.16 Compare and contrast carbohydrates, lipids, proteins, and nucleic acids in terms of their building blocks, structures, and functions in the body.			X		
1.2.17 Differentiate between fibrous and globular proteins.					
1.2.18 Compare and contrast the structure of functions of DNA and RNA.			X		

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
1.2.19 Define *enzyme* and explain the role of enzymes.			X		
1.2.20 Explain the importance of ATP in the body.					
1.3 Cells and Tissues		Biology			
Overview of the cellular basis of life					
1.3.1 Name the four elements that make up the bulk of living matter.					
Anatomy of a generalized cell					
1.3.2 Define *cell*, *organelle*, and i*nclusion*.					
1.3.3 Identify on a cell model or diagram the three major cell regions (nucleus, cytoplasm, plasma membrane).					
1.3.4 List the structures of a nucleus and explain the function of chromatin and nucleoli.			X		
1.3.5 Identify the organelles on a cell model or describe them and discuss the major function of each.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Cell physiology		Biology			
1.3.6 Define *selective permeability*, *diffusion, active transport*, *passive transport*, *solute pumping*, *exocytosis*, *endocytosis*, *phagocytosis*, *bulk-phase endocytosis*, *hypertonic*, *hypotonic*, and *isotonic*.					
1.3.7 Describe the structure of the plasma membrane, and explain how the various transport processes account for the directional movements of specific substances across the plasma membrane.					
1.3.8 Describe briefly the process of DNA replication and mitosis. Explain the importance of mitotic cell division.					
1.3.9 In relation to protein synthesis, describe the roles of DNA and of the three major varieties of RNA.			X		
1.3.10 Name some cell types, and relate their overall shape and internal structure to their special functions.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Body tissues 1.3.11 Name the four major tissue types and their chief subcategories. Explain how the four major tissues types differ structurally and functionally. 1.3.12 Give the chief locations of the various tissue types in the body. 1.3.13 Describe the process of tissue repair (wound healing). Developmental aspects of cells and tissues 1.3.14 Define *neoplasm* and distinguish between benign and malignant neoplasm. 1.3.15 Explain the significance of the fact that some tissue types are largely amitotic after the growth stages are over.			X		

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
2.0 STUDENTS WILL UNDERSTAND THE CONTRIBUTIONS AND INTERACTIONS OF THE SKIN, SKELETAL AND MUSCULAR SYSTEMS IN PROMOTING BODY SUPPORT, PROTECTION, MOBILITY AND FORM.	N/A	2.0	N/A	Quiz Test Lab Practical	25% of class time
2.1 Skin and Body Membranes		Biology 10.0			
Classification of body membrane					
2.1.1 List the general functions of each membrane type – cutaneous, mucous, serous, and synovial – and give its location of the body.					
2.1.2 Compare the structure of the major membrane types.					
Integumentary system					
2.1.3 List several important functions of the integument system and explain how these functions are accomplished.					
2.1.4 When provided with a model or diagram of the skin, recognize and name the following skin structures: epidermis, dermis, hair and hair follicle, sebaceous gland, sweat gland.					
2.1.5 Name the layers of the epidermis and describe the characteristics of each.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
2.1.6 Describe the distribution and function of the epidermal derivates – sebaceous glands, sweat glands, and hair. 2.1.7 Name the factors that determine skin color and describe the function of melanin. 2.1.8 Differentiate between first-, second-, and third-degree burns. 2.1.9 Explain the importance of the rule of nines. 2.1.10 Summarize the characteristics of basal cell carcinoma, squamous cell carcinoma and malignant melanoma. Developmental aspects of skin and body membranes 2.1.11 List several examples of integumentary system aging.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
2.2 The Skeletal System Bones: an overview 2.2.1 Identify the subdivisions of the skeleton as axial or appendicular. 2.2.2 List at least three functions of the skeletal system. 2.2.3 Name the four main classifications of bones. 2.2.4 Identify the major anatomical areas of a long bone. 2.2.5 Explain the role of bone salts and the organic matrix in making bone both hard and flexible. 2.2.6 Describe briefly the process of bone formation in the fetus and summarize the events of bone remodeling throughout life. 2.2.7 Name and describe the various types of fractures.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Axial skeleton 2.2.8 On a skull or diagram, identify and name the bones of the skull. 2.2.9 Describe how the skull of a newborn infant differs from that of an adult, and explain the functions of fontanels. 2.2.10 Name the parts of a typical vertebra and explain in general how the cervical, thoracic, and lumbar vertebrae differ from one another. 2.2.11 Discuss the importance of the intervertebral discs and spinal curvatures. 2.2.12 Explain how abnormal spinal curvatures (scoliosis, lordosis, and kyphosis) differ from one another. Appendicular skeleton 2.2.13 Identify on a skeleton or diagram the bones of the shoulder and pelvic girdles and their attached limbs. 2.2.14 Describe important differences between a male and female pelvis.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Joints 2.2.15 Name the three major categories of joints and compare the amount of movement allowed by each. Developmental aspects of the skeleton 2.2.16 Identify some of the causes of bone and joint problems throughout life. **2.3 The Muscular System** Overview of muscle tissues 2.3.1 Describe the similarities and differences in the structure and function of the three types of muscle tissue and indicate where they are found on in the body. 2.3.2 Define *muscular system*. 2.3.3 Define and explain the role of the following: *endomysium*, *perimysium*, *epimysium*, *tendon*, and *aponeurosis*. Microscopic anatomy of skeletal muscle 2.3.4 Describe the microscopic structure of skeletal muscle and explain the role of actin- and myosin- containing myofilaments.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Skeletal muscle activity 2.3.5 Describe how an action potential is initiated in a muscle cell. 2.3.6 Describe the events of muscle cell contraction. 2.3.7 Define *graded response*, *tetanus*, *isotonic* and *isometric contractions*, and *muscle tone* as these terms apply to a skeletal muscle. 2.3.8 Describe three ways in which ATP is regenerated during muscle activity. 2.3.9 Define *oxygen debt* and *muscle fatigue* and list possible causes of muscle fatigue. 2.3.10 Describe the effect of aerobic and resistance exercise on skeletal muscles and other body organs. Muscle movements, types, and names 2.3.11 Define *origin*, *insertion*, *prime mover*, *antagonist*, *synergist*, and *fixator* as they relate to muscles. 2.3.12 Demonstrate or identify the different types of body movements. 2.3.13 List some criteria used in naming muscles.					

		CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
	Gross anatomy of skeletal muscles 2.3.14 Name and locate the major muscles of the human body and state the action of each. Developmental aspects of the muscular system 2.3.15 Explain the importance of a nerve supply and exercise in keeping muscles healthy. 2.3.16 Describe the changes that occur in aging muscles.					
3.0	**STUDENTS WILL UNDERSTAND THE ROLE OF THE NERVOUS AND ENDOCRINE SYSTEMS IN REGULATION AND CONTROL OF THE BODY.**	N/A	3.0		Quiz Test Lab Practical	25% of class time
3.1	**The Nervous System**		Biology 9.0	X		
	Organization of the nervous system 3.1.1 List the general functions of the nervous system. 3.1.2 Explain the structural and functional classifications of the nervous system. 3.1.3 Define *central nervous system* and *peripheral nervous system* and list the major parts of each.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Nervous tissue: structure and function 3.1.4 State the function of neurons and neuroglia. 3.1.5 Describe the general structure of a neuron and name its important anatomical regions. 3.1.6 Describe the composition of gray matter and white matter. 3.1.7 List the two major functional properties of neurons. 3.1.8 Classify neurons according to structure ad function. 3.1.9 List the types of general sensory receptors and describe their functions. 3.1.10 Describe the events that lead to the generation of a nerve impulse. 3.1.11 Define *reflex arc* and list its elements.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Central nervous system 3.1.12 Identify and indicate the functions of the major regions of the cerebral hemispheres, diencephalons, brain stem, and cerebellum on a human brain model or diagram. 3.1.13 Name the three meningeal layers, and state their functions. 3.1.14 Discuss the formation and function of cerebrospinal fluid and the blood-brain barrier. 3.1.15 Compare the signs of a CVA with those of Alzheimer's disease; of a contusion with those of a concussion. 3.1.16 Define *EEG* and explain how it evaluates neural functioning. 3.1.17 List two important functions of the spinal cord. 3.1.18 Describe spinal cord structure.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Peripheral nervous system 3.1.19 Describe the general structure of a nerve. 3.1.20 Identify the cranial nerves by number and by name and list the major functions of each. 3.1.21 Describe the origin and fiber composition of ventral and dorsal roots, the spinal nerve proper, ventral and dorsal rami. 3.1.22 Discuss the distribution of the dorsal and ventral rami of spinal nerves. 3.1.23 Name the four major nerve plexuses, give the major nerves of each and describe their distribution. 3.1.24 Identify the site of origin and explain the function of the sympathetic and parasympathetic divisions of the autonomic nervous system. 3.1.25 Contrast the effect of the parasympathetic and sympathetic divisions on the following organs: heart, lungs, digestive system, blood vessels.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Developmental aspects of the nervous system 3.1.26 List several factors that may have harmful effects on brain development. 3.1.27 Describe the causes, signs, and consequences of the following congenital disorders: spinal bifida, anencephaly, and cerebral palsy. 3.1.28 Explain the decline in brain size that occurs with age. 3.1.29 Define *senility* and list some possible causes. **3.2 Special Senses** The eye and vision 3.2.1 When provided with a model or diagram, identify the accessory eye structures, and list the functions of each. 3.2.2 Explain how rod and cone function differ. 3.2.3 Name the eye tunics and indicate the major function of each. 3.2.4 Describe image formation on the retina.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
3.2.5 Trace the pathway of light through the eye to the retina. 3.2.6 Discuss the importance of opthalmoscopic examination. 3.2.7 Define the following terms: *accommodation*, *astigmatism*, *blind spot*, *cataract*, *emmetropia*, *glaucoma*, *hyperopia*, *myopia*, and *refraction*. 3.2.8 Trace the visual pathway to the optic cortex. 3.2.9 Discuss the importance of the papillary and convergence reflexes. The ear: healing and balance 3.2.10 Identify the structures of the external, middle, and inner ear, and list the functions of each. 3.2.11 Describe how the equilibrium organs help maintain balance. 3.2.12 Explain the function of the organ of Corti in hearing.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
3.2.13 Define *sensorineural* and *conductive deafness*. 3.2.14 Explain how one is able to localize the source of a sound. Chemical senses: taste and smell 3.2.15 Describe the location, structure, and function of the olfactory and taste receptors. 3.2.16 Name the four basic taste sensations and list factors that modify the sense of taste. Developmental aspects of the special senses 3.2.17 Describe changes that occur with age in the special sense organs. **3.3 The Endocrine System** The endocrine system and hormone function – an overview 3.3.1 Define *hormone* and *target organ*. 3.3.2 Describe how hormones bring about their effects in the body.		Biology 9.0			

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
3.3.3 Explain how various endocrine glands are stimulated to release their hormonal products.					
3.3.4 Define *negative feedback* and describe its role in regulating hormone levels in blood.			X		
The major endocrine organs					
3.3.5 Describe the difference between endocrine and exocrine glands.					
3.3.6 On an appropriate diagram, identify the major endocrine glands and tissues.					
3.3.7 List hormones produced by the endocrine glands and discuss their general functions.					
3.3.8 Discuss ways in which hormones promote body homeostasis.					
3.3.9 Describe the functional relationship between the hypothalamus and the pituitary.					
3.3.10 Describe major pathological consequences of hypersecretion and hyposecretion of the hormones discussed in this chapter.					

		CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
	Other hormone-producing tissues and organs 3.3.11 Indicate the endocrine role of the kidneys, the stomach and intestines, the heart, and the placenta. Developmental aspects of the endocrine system 3.3.12 Describe the effect of aging on the endocrine system and body homeostasis.					
4.0	**STUDENTS WILL UNDERSTAND THE SYSTEMS THAT MAINTAIN HOMEOSTASIS THROUGHOUT THE BODY.**	N/A	4.0	N/A	Quiz Test Lab Practical	25% of class time

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
4.1 Blood Composition and functions of blood 4.1.1 Indicate the composition and volume of whole blood. 4.1.2 Describe the composition of plasma and discuss its importance in the body. 4.1.3 List the cell types making up the formed elements and describe the major functions of each type. 4.1.4 Define *anemia*, *polycythemia*, leucopenia, and *leukocytosis* and list possible causes for each. 4.1.5 Explain the role of the hemocytoblast.		Biology 9.0			

		CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
5.0	**STUDENTS WILL UNDERSTAND THE SYSTEMS THAT MAINTAIN HOMEOSTASIS THROUGHOUT THE BODY.**	N/A	4.0	N/A	Quiz Test Lab Practical	25% of class time
5.1	**Blood**		Biology 9.0			
	5.1.1 Composition and functions of blood					
	5.1.2 Indicate the composition and volume of whole blood.					
	5.1.3 Describe the composition of plasma and discuss its importance in the body.					
	5.1.4 List the cell types making up the formed elements and describe the major functions of each type.					
	5.1.5 Define *anemia*, *polycythemia*, leucopenia, and *leukocytosis* and list possible causes for each.					
	5.1.6 Explain the role of the hemocytoblast.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Homeostasis 5.1.7 Describe the blood-clotting process. 5.1.8 Name some factors that may inhibit or enhance the blood-clotting process. Blood groups and transfusions 5.1.9 Describe ABO and Rh blood groups. 5.1.10 Explain the basis for a transfusion reaction. 5.1.11 Developmental aspects of blood 5.1.12 Explain the basis of physiologic jaundice seen in some newborn babies. 5.1.13 Indicate blood disorders that increase in frequency in the aged.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
5.2 The Cardiovascular System The heart 5.2.1 Describe the location of the heart in the body and identify its major anatomical areas on an appropriate model or diagram. 5.2.2 Trace the pathway of blood through the heart. 5.2.3 Compare the pulmonary and systemic circuits. 5.2.4 Explain the operation of the heart valves. 5.2.5 Name the functional blood supply of the heart. 5.2.6 Name the elements of the intrinsic conduction system of the heart and describe the pathway of impulses through this system. 5.2.7 Define *systole*, *diastole*, *stroke volume*, and *cardiac cycle*. 5.2.8 Define *heart sounds* and *murmur*. 5.2.9 Explain what information can be gained from an electrocardiogram.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
5.2.10 Describe the effect of each of the following on heart rate: stimulation by the vagus nerve, exercise, epinephrine, and various ions. Blood vessels 5.2.11 Compare and contrast the structures and function of arteries, veins, and capillaries. 5.2.12 Identify the body's major arteries and veins and name the body regions supplied by each. 5.2.13 Discuss the unique features of special circulations of the body: arterial circulation of the brain, hepatic portal circulation, and fetal circulation. 5.2.14 Define *blood pressure* and *pulse*, and name several pulse points. 5.2.15 List factors affecting and/or determining blood pressure. 5.2.16 Define *hypertension* and *atherosclerosis* and describe possible health consequences of these conditions. 5.2.17 Describe the changes that occur across capillary walls.		Biology 10.0			

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Developmental aspects of the cardiovascular system 5.2.18 Briefly describe the development of the cardiovascular system. 5.2.19 Name the fetal vascular modifications and describe their function before birth. 5.2.20 Explain how regular exercise and diet low in fats and cholesterol may help maintain cardiovascular health.					
5.3 The Lymphatic System and Body Defenses The lymphatic system 5.3.1 Name the two major types of structures composing the lymphatic system and explain how the lymphatic system is functionally related to the cardiovascular and immune system. 5.3.2 Describe the composition of lymph, and explain its function and transport. 5.3.3 Describe the functions of lymph nodes, tonsils, the thymus, Peyer's patches, and the spleen.		Biology 10.0			

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Body defenses 5.3.4 Describe the protective functions of skin and mucous membranes. 5.3.5 Explain the importance of phagocytes and natural killer cells. 5.3.6 Describe the inflammatory process. 5.3.7 Name several antimicrobial substance produced by the body that act in nonspecific body defense. 5.3.8 Explain how fever helps protect the body against invading bacteria. 5.3.9 Define antigen and hapten and name substances that act as antigens. 5.3.10 Name the two arms of the immune response and relate each to a specific lymphocyte type. 5.3.11 Compare and contrast the development of B and T cells. 5.3.12 State the roles of B-, T-, and plasma cells 5.3.13 Explain the importance of macrophages in immunity.			X		

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
5.3.14 Describe several ways in which antibodies act against antigens. 5.3.15 Distinguish between active and passive immunity. 5.3.16 Describe immunodeficiencies, allergies, and autoimmune diseases. Developmental aspects of the lymphatic system and body defenses 5.3.17 Describe the origin of the lymphatic vessels. 5.3.18 Describe the effects of aging on immunity.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
5.4 The Respiratory System Functional anatomy of the respiratory system 5.4.1 Name the organs forming the respiratory passageway from the nasal cavity to the alveoli of the lungs and describe the function of each. 5.4.2 Describe several protective mechanisms of the respiratory system. 5.4.3 Describe the stricture and function of the lungs and the pleural coverings.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Respiratory physiology 5.4.4 Define *cellular respiration*, *external respiration*, *internal respiration*, *pulmonary ventilation*, *expiration*, and *inspiration*. 5.4.5 Explain how the respiratory muscles cause volume changes that lead to air flow into and out of the lungs. 5.4.6 Define the following respiratory volumes: *tidal volume*, *vital capacity*, *expiratory reserve volume*, *inspiratory reserve volume*, and *residual air*. 5.4.7 Name several nonrespiratory air movements and explain how they modify or differ from normal respiratory air movements. 5.4.8 Describe the process of gas exchanges in lungs and tissues. 5.4.9 Describe how oxygen and carbon dioxide are transported in the blood. 5.4.10 Name the brain areas involved in control of respiration. 5.4.11 Name several physical factors that influence respiratory rate.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
5.4.12 Explain the relative importance of oxygen and carbon dioxide in modifying the rate and depth of breathing. 5.4.13 Explain why it is not possible to stop breathing voluntarily. 5.4.14 Define *apnea*, *dyspnea*, *hyperventilation*, *hypoventilation*, and *chronic obstructive pulmonary disease*. Respiratory disorders 5.4.15 Describe the symptoms and possible causes of COPD and lung cancer. Developmental aspects of the respiratory system 5.4.16 Describe normal changes that occur in respiratory system functioning from infancy to old age.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
5.5 The Digestive System Anatomy of the digestive system 5.5.1 Name the organs of the alimentary canal and accessory digestive organs and identify each on an appropriate diagram or model. 5.5.2 Identify the overall function of the digestive system as digestion and absorption of foodstuffs and describe the general activities of each digestive system organ. 5.5.3 Describe the function and composition of saliva. 5.5.4 Name the deciduous and permanent teeth and describe the basic anatomy of a tooth. 5.5.5 Explain how villi aid digestive processes in the small intestine.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Functions of the digestive system 5.5.6 Describe the mechanisms of swallowing, vomiting, and defecation. 5.5.7 Describe how foodstuffs in the digestive tract are mixed and moved along the tract. 5.5.8 Describe the function of local hormones in the digestive process. 5.5.9 List the major enzymes or enzyme groups produced by the digestive organs or accessory glands and name the foodstuffs on which they act. 5.5.10 Name the end products of protein, fat, and carbohydrate digestion. 5.5.11 State the function of bile in the digestive process. Nutrition 5.5.12 Define *nutrient* and *calorie*. 5.5.13 List the six major nutrient categories. Note the principle cellular uses of each.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Metabolism 5.5.14 Define *enzyme*, *metabolism*, *anabolism*, and *catabolism*. 5.5.15 Describe the metabolic roles of the liver. 5.5.16 Recognize the sources of carbohydrates, fats, and proteins and their uses in cell metabolism. 5.5.17 Explain the importance of energy balance in the body and indicate consequences of energy imbalance. 5.5.18 List several factors that influence metabolic rate and indicate the effect of each. 5.5.19 Describe how body temperature is regulated. 5.5.20 Developmental aspects of the digestive system and metabolism. 5.5.21 Name important congenital disorders of the digestive system and significant inborn errors. 5.5.22 Describe the effect of aging on the digestive system.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
5.6 Urinary System Kidneys 5.6.1 Describe the location of the kidneys in the body. 5.6.2 Identify the following regions of a kidney (longitudinal section): hilus, cortex, medulla, medullary pyramids, calyces, pelvis and renal columns. 5.6.3 Recognize that the nephron is the structural and functional unit of the kidney and describe its anatomy. 5.6.4 Describe the process of urine formation, identifying the areas of the nephron that are responsible for filtration, reabsorption, and secretion. 5.6.5 Describe the function of the kidneys in excretion of nitrogen-containing wastes. 5.6.6 Define *polyuria*, *anuria*, *oliguria*, and *diuresis*. 5.6.7 Describe the composition of normal urine. 5.6.8 List abnormal urinary components.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Ureters, urinary bladder, and urethra 5.6.9 Describe the general structure and function of the ureters, bladder, and urethra. 5.6.10 Compare the course and length of the male urethra to that of the female. 5.6.11 Define *micturition*. 5.6.12 Describe the difference in control of the external and internal urethral sphincters. 5.6.13 Name three common urinary tract problems. Fluid, electrolyte, and acid-base balance 5.6.14 Name and localize the three main fluid compartments of the body. 5.6.15 Explain the role of antidiruetic hormone (ADH) in the regulation of water balance by the kidney. 5.6.16 Explain the role of aldosterone in sodium and potassium balance of the body. 5.6.17 Compare and contrast the relative speed of buffers, the respiratory system, and the kidneys in maintaining the acid-base balance of the blood.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Developmental aspects of the urinary system 5.6.18 Describe three common congenital problems of the urinary system. 5.6.19 Describe the effect of aging on urinary system functioning. **5.7 Reproductive System** (optional) Anatomy of the male reproductive system 5.7.1 Discuss common purpose of the reproductive system organs. 5.7.2 When provided with a model or diagram, identify the organs of the male reproductive system, and discuss the general function of each. 5.7.3 Name the endocrine and exocrine products of the testes. 5.7.4 Discuss the composition of semen, and name the glands that produce it. 5.7.5 Trace the pathway followed by a sperm from the testis to the body exterior. 5.7.6 Define *erection*, *ejaculation*, and *circumcision*.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Male reproductive functions 5.7.7 Define *meiosis* and *spermatogenesis*. 5.7.8 Describe the structure of a sperm, and relate its structure to its function. 5.7.9 Describe the effect of FSH and LH on testis functioning. Anatomy of the female reproductive system 5.7.10 When provided with an appropriate model or diagram, identify the organs of the female reproductive system, and discuss the general function of each. 5.7.11 Describe the functions of the vesicular follicle and corpus luteum of the ovary. 5.7.12 Define *endometrium*, *myometrium*, and *ovulation*. 5.7.13 Indicate the location of the following regions of the female uterus: cervix, fundus, body.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Female reproductive functions and cycles 5.7.14 Define *oogenesis*. 5.7.15 Describe the influence of FSH and LH on ovarian function. 5.7.16 Describe the phases and controls of the menstrual cycle. Mammary glands 5.7.17 Describe the structure and function of the mammary glands.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Survey of pregnancy and embryonic development 5.7.18 Define *fertilization* and *zygote*. 5.7.19 Describe implantation. 5.7.20 Distinguish between an embryo and a fetus. 5.7.21 List the major functions of the placenta. 5.7.22 Indicate several ways that pregnancy alters or modifies the functioning of the mother's body. 5.7.23 Describe how labor is initiated, and briefly discuss the three stages of labor. 5.7.24 List several agents that can interfere with normal fetal development.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Developmental aspects of the reproductive system 5.7.25 Describe the importance of the presence/absence of testosterone during embryonic development of the reproductive system organs. 5.7.26 Define *menarche* and *menopause*. 5.7.27 List common reproductive system problems seen in adult and aging males and females.					

	CAHSEE	Standards & Benchmarks	Standards Based Test (CST)	Assessment	Timeline
Investigation and Experimentation					
1.0 SCIENTIFIC PROGRESS IS MADE BY ASKING MEANINGFUL QUESTIONS AND CONDUCTING CAREFUL INVESTIGATIONS. AS A BASIS FOR UNDERSTANDING THIS CONCEPT AND ADDRESSING THE CONTENT IN THE OTHER FOUR STRANDS, STUDENTS SHOULD DEVELOP THEIR OWN QUESITONS AND PERFORM INVESTIGATIONS.	N/A	**Science Investigation and Experiments**	N/A	Lab Practical	Ongoing
1.1 Formulate explanations by using logic and evidence.		1.INV.4			
1.2 Recognize the usefulness and limitations of models and theories as scientific representations of reality.		1.INV.7			
1.3 Investigate a science-based societal issue by researching the literature, analyzing data, and communicating the findings. Examples of issues include: • Stem cell research and treatment • Cancer treatments • Gene therapy • Diet, nutrition, and exercise impact on athletes.		1.INV.13			

TEACHING STRATEGIES AND PROCEDURES

- Lecture
- Labs
- Group Activities
- Presentations
- Research Projects

GRADING GUIDELINES

See AUHSD Grade Guidelines: Final Mark Rubric and Final Course Mark Determination Components.