



**SPRING GROVE AREA SCHOOL DISTRICT**



**PLANNED COURSE OVERVIEW**

<b>Course Title:</b> Anatomy and Physiology II <b>Grade Level(s):</b> 11 - 12 <b>Units of Credit:</b> 1 <b>Classification:</b> Core or Elective		<b>Length of Course:</b> Full Year <b>Periods Per Cycle:</b> 6 <b>Length of Period:</b> 40 Minutes <b>Total Instructional Time:</b> 120 Hours	
<b>Course Description</b>			
<p>This advanced level course will examine human anatomy and physiology, and it is designed for students wishing to pursue a medical career. This course will study the following (but not limited to) body systems: Anatomy Terminology, Nervous System, Special Senses, Endocrine System, Renal/Urinary System, Digestive System, Reproductive System, and Microbiology which are essential to understanding human physiology. Human anatomy and physiology will offer a variety of laboratory experiences, which will include specimen dissections. Prerequisite: Successful completion of Chemistry or Chemistry Honors, with a 75% or higher.</p>			
<b>Instructional Strategies, Learning Practices, Activities, and Experiences</b>			
Teacher Demonstration Detailed Laboratory Experiments Inquiry Laboratory Experiments Textbook Reading Homework	Posted Objectives and Agenda Formal Assessments Guided Practice Online Tutorials/Resources Critical Thinking	Bell Ringers Class Discussion Flexible Groups APL Strategies	
<b>Assessments</b>			
Chapter Examinations Laboratory Write-ups/Reports	Mid Term and Final Exam Unit Projects	Inquiry and Discovery Learning Study Guides	
<b>Materials/Resources</b>			
Anatomy and Physiology Textbook LMS	PowerPoint Lectures Note Packets Online Resources	Laboratory Resources and Equipment Laboratory Experiments	

**Adopted:** 5/23/22

**Revised:** 5/22/23

Language of Anatomy	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<ol style="list-style-type: none"> <li>1. Overview of Anatomy and Physiology</li> <li>2. Language of Anatomy</li> <li>3. Prefixes/Suffixes</li> </ol>	<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Define anatomy and physiology.</li> <li>2. Explain how anatomy and physiology are related.</li> <li>3. Name the levels of structural organization that make up the human body and explain how they are related.</li> <li>4. Use proper anatomical terminology to describe body directions, surfaces, and body planes.</li> <li>5. Analyze and explain examples of homeostasis in relation to positive and negative feedback mechanisms.</li> <li>6. Locate the major body cavities and list the chief organs in each cavity.</li> <li>7. Identify and correctly use prefixes and suffixes as they pertain to anatomy.</li> </ol> <p><b>Standards:</b></p> <p><b>HS-LS1-2 and 3.1.9-12B:</b> Develop and use a model to illustrate the hierarchical organization of interactive systems that provide specific functions within multicellular organisms.</p> <p><b>HS-LS1-3 and 3.1.9-12C:</b> Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</p>

<b>Nervous System</b>	
<b>CONTENT/KEY CONCEPTS</b>	<b>OBJECTIVES/STANDARDS</b>
<ol style="list-style-type: none"> <li>1. Organization of the Nervous System</li> <li>2. Structure and Function</li> <li>3. Central Nervous System</li> <li>4. Peripheral Nervous System</li> <li>5. Developmental Aspects</li> </ol>	<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. List the general functions of the nervous system.</li> <li>2. Explain the structural and functional classifications of the nervous system.</li> <li>3. State the function of neurons and neuroglia.</li> <li>4. Describe the general structure of a neuron and name its important anatomical regions.</li> <li>5. Describe the composition of gray matter and white matter.</li> <li>6. List the two major functional properties of neurons.</li> <li>7. Classify neurons according to structure and function.</li> <li>8. List the types of general sensory receptors and describe their functions.</li> <li>9. Describe the events that lead to the generation of a nerve impulse and its conduction from one neuron to another.</li> <li>10. Define reflex arc and list its elements.</li> <li>11. Define central nervous system and peripheral nervous system and list the major parts of each.</li> <li>12. Identify and indicate the functions of the major regions of the cerebral hemispheres, diencephalon, brain stem, and cerebellum on a human brain model or diagram.</li> <li>13. Name the three meningeal layers and state their functions.</li> <li>14. Discuss the formation and function of cerebrospinal fluid and the blood-brain barrier.</li> <li>15. Compare the signs of a CVA with those of Alzheimer's disease; of a contusion with those of a concussion.</li> <li>16. List two important functions of the spinal cord.</li> <li>17. Describe spinal cord structure.</li> <li>18. Describe the general structure of a nerve.</li> <li>19. Identify the cranial nerves by number and by name and list the major functions of each.</li> <li>20. Define spinal cord injuries and differentiate between the types.</li> </ol> <p><b>Standards:</b>  <b>HS-LS1-2 and 3.1.9-12B:</b> Develop and use a model to illustrate the hierarchical organization of interactive systems that provide specific functions within multicellular organisms.</p>

<b>Special Senses</b>	
<b>CONTENT/KEY CONCEPTS</b>	<b>OBJECTIVES/STANDARDS</b>
<ol style="list-style-type: none"> <li>1. The Eye and Vision</li> <li>2. The Ear: Hearing and Balance</li> <li>3. Chemical Senses: Taste and Smell</li> <li>4. Developmental Changes and Disease</li> </ol>	<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. When provided with a model or diagram, identify the accessory eye structures, and list the functions of each.</li> <li>2. Explain the physiology of crying.</li> <li>3. Name the eye tunics and indicate the major function of each.</li> <li>4. Explain how rod and cone function differ.</li> <li>5. Describe image formation on the retina.</li> <li>6. Trace the pathway of light through the eye to the retina.</li> <li>7. Explain disorders such as: night blindness, colorblindness, floaters, and astigmatism.</li> <li>8. Explain and examine accommodation, blind spot, cataract, emmetropia, glaucoma, hyperopia, myopia, refraction, and more.</li> <li>9. Trace the visual pathway to the optic cortex.</li> <li>10. Discuss the importance of the pupillary and convergence reflexes.</li> <li>11. Identify the structures of the external, middle, and internal ear, and list the functions of each.</li> <li>12. Explain the function of the organ of Corti in hearing.</li> <li>13. Define sensorineural and conductive deafness and list possible causes of each.</li> <li>14. Describe how the equilibrium organs help maintain balance.</li> <li>15. Identify the structures of the tongue and nose and list the functions of each.</li> <li>16. Describe the location, structure, and function of the olfactory and taste receptors.</li> <li>17. Name the four basic taste sensations and list factors that modify the sense of taste.</li> <li>18. State the factors that affect gustation.</li> <li>19. Explain phenomena such as odor snapshots, olfactory auras and anosmia.</li> <li>20. Describe changes that occur with age in the special sense organs.</li> </ol> <p><b>Standards:</b>  <b>HS-LS1-2 and 3.1.9-12B:</b> Develop and use a model to illustrate the hierarchical organization of interactive systems that provide specific functions within multicellular organisms.</p>

Endocrine System	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<ol style="list-style-type: none"> <li>1. Chemistry of Hormones</li> <li>2. Functions of Hormones</li> <li>3. Major Endocrine Organs</li> <li>4. Physiology of the Organs</li> <li>5. Homeostatic Imbalances</li> </ol>	<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Define hormone and target organ.</li> <li>2. Describe how hormones bring about their effects in the body.</li> <li>3. Explain how various endocrine glands are stimulated to release their hormonal products.</li> <li>4. Define negative feedback and describe its role in regulating blood levels of the various hormones.</li> <li>5. Describe the difference between endocrine and exocrine glands.</li> <li>6. On an appropriate diagram, identify the major endocrine glands and tissues.</li> <li>7. List hormones produced by the endocrine glands and discuss their general functions.</li> <li>8. Discuss ways in which hormones promote body homeostasis by giving examples of hormonal actions.</li> <li>9. Describe the functional relationship between the hypothalamus and the pituitary gland.</li> <li>10. Describe major pathological consequences of hypersecretion and hyposecretion of the hormones considered in this chapter.</li> </ol> <p><b>Standards:</b>  <b>HS-LS1-2 and 3.1.9-12B:</b> Develop and use a model to illustrate the hierarchical organization of interactive systems that provide specific functions within multicellular organisms.  <b>HS-LS1-3 and 3.1.9-12C:</b> Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</p>

<b>Reproductive System</b>	
<b>CONTENT/KEY CONCEPTS</b>	<b>OBJECTIVES/STANDARDS</b>
<ol style="list-style-type: none"> <li>1. Male vs. Female Anatomy</li> <li>2. Spermatogenesis</li> <li>3. Oogenesis</li> <li>4. Mammary Glands</li> <li>5. Survey of Pregnancy</li> <li>6. Homeostatic Imbalances</li> </ol>	<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Discuss the common purpose of the reproductive system organs.</li> <li>2. When provided with a model or diagram, identify the organs of the male and female reproductive system, and discuss the general function of each.</li> <li>3. Name the endocrine and exocrine products of the ovaries and testes.</li> <li>4. Discuss the composition of semen and name the glands that produce it.</li> <li>5. Trace the pathway followed by a sperm from the testis to the body exterior.</li> <li>6. Define erection, ejaculation, and circumcision.</li> <li>7. Define meiosis, oogenesis, spermatogenesis.</li> <li>8. Describe the structure of a sperm and relate its structure to its function.</li> <li>9. Describe the effect of FSH and LH on testis functioning.</li> <li>10. Describe the functions of the vesicular follicle and corpus luteum of the ovary.</li> <li>11. Define endometrium, myometrium, and ovulation.</li> <li>12. Indicate the location of the following regions of the female uterus: cervix, fundus, body.</li> <li>13. Describe the influence of FSH and LH on ovarian function and the phases/control of the menstrual cycle.</li> <li>14. Describe the structure and function of the mammary glands.</li> <li>15. Define fertilization and zygote.</li> <li>16. Describe implantation and distinguish between an embryo and a fetus.</li> <li>17. List the major functions of the placenta.</li> <li>18. Indicate several ways that pregnancy alters or modifies the functioning of the mother's body.</li> <li>19. Describe how labor is initiated, and briefly discuss the three stages of labor.</li> <li>20. List several agents that can interfere with normal fetal development.</li> </ol> <p><b>Standards:</b>  <b>HS-LS1-2 and 3.1.9-12B:</b> Develop and use a model to illustrate the hierarchical organization of interactive systems that provide specific functions within multicellular organisms.</p>

<b>Digestive System &amp; Nutrition</b>	
<b>CONTENT/KEY CONCEPTS</b>	<b>OBJECTIVES/STANDARDS</b>
<ol style="list-style-type: none"> <li>1. Anatomy of the Digestive System</li> <li>2. Functions of the Digestive System</li> <li>3. Dietary Sources                             <ol style="list-style-type: none"> <li>a. Carbohydrates</li> <li>b. Lipids</li> <li>c. Proteins</li> <li>d. Vitamins and Minerals</li> </ol> </li> <li>4. Metabolism</li> <li>5. Macromolecule Metabolism</li> <li>6. Body Energy Balance</li> </ol>	<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Name the organs of the alimentary canal and accessory digestive organs and identify each on an appropriate diagram or model.</li> <li>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.</li> <li>3. Describe the composition and function(s) of saliva.</li> <li>4. Explain how villi aid digestive processes in the small intestine.</li> <li>5. Describe the mechanisms of swallowing, vomiting, and defecation.</li> <li>6. Describe how foodstuffs in the digestive tract are mixed and moved along the tract.</li> <li>7. Describe the function of local hormones in the digestive process.</li> <li>8. List the major enzymes or enzyme groups produced by the digestive organs or accessory glands and name the foodstuffs on which they act.</li> <li>9. State the function of bile in the digestive process.</li> <li>10. Name the end products of protein, fat, and carbohydrate digestion.</li> <li>11. List the six major nutrient categories. Note important dietary sources and their main cellular uses.</li> <li>12. Define enzyme, metabolism, anabolism, and catabolism.</li> <li>13. Recognize the uses of carbohydrates, fats, and proteins in cell metabolism.</li> <li>14. Explain the importance of energy balance in the body and indicate consequences of energy imbalance.</li> <li>15. List several factors that influence metabolic rate and indicate each one's effect.</li> </ol> <p><b>Standards:</b>  <b>HS-LS1-2 and 3.1.9-12B:</b> Develop and use a model to illustrate the hierarchical organization of interactive systems that provide specific functions within multicellular organisms.</p>

Microbiology	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<ol style="list-style-type: none"> <li>1. Prokaryotes – Anatomy</li> <li>2. Classifying and Naming Microbes</li> <li>3. Microscopy for Microbes</li> <li>4. Microbial Growth</li> <li>5. Diseases and Infections</li> </ol>	<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Differentiate among the major characteristics of each group of microorganisms.</li> <li>2. Define bacteriology, mycology, parasitology, immunology, and virology.</li> <li>3. List at least four beneficial activities of microorganisms.</li> <li>4. Define normal microbiota and resistance.</li> <li>5. Define and describe several infectious diseases.</li> <li>6. Define emerging infectious diseases.</li> <li>7. Identify different types of microscopies: light, TEM, SEM, bright field, dark field, phase-contrast, DIC, fluorescence, and confocal microscopy.</li> <li>8. Differentiate types of staining such as acidic dye, basic dye, gram staining and more.</li> <li>9. Identify the three basic types of bacteria.</li> <li>10. Identify characteristics of prokaryotic cells.</li> <li>11. Classify microbial growth based on temperatures and pH.</li> <li>12. Classify microbes based on oxygen use and other nutrient requirements.</li> <li>13. Examine growth measures of microbes.</li> <li>14. Define phases of growth.</li> <li>15. Differentiate prokaryotic groups based on pathogenic nature, growth habits, and nutrient requirements.</li> <li>16. Identify pathogenic microbes based on gram staining, special features, and type of infectious disease it causes.</li> <li>17. List defining characteristics of fungi.</li> <li>18. Differentiate a virus from a bacterium.</li> <li>19. Define viral species.</li> <li>20. Identify common viral species based using viral characteristics.</li> </ol> <p><b>Standards:</b>  <b>HS-LS1-2 and 3.1.9-12B:</b> Develop and use a model to illustrate the hierarchical organization of interactive systems that provide specific functions within multicellular organisms.</p>