Georgia Standards of Excellence  
High School Curriculum Map  
Course Title: Human Anatomy and Physiology  
Course Abbreviation: SCI 333-334  
State ID: 26.07300

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<td>Tissues</td>
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Standards:  
SAP 1: Students will analyze anatomical structures in relationship to their physiological functions.  
- Apply correct terminology when explaining the orientation of body parts & regions.  
- Investigate the interdependence of the various body systems to each other and to the body as a whole.

Standards:  
SAP 2: Students will analyze the interdependence of the integumentary, skeletal, and muscular systems as these relate to the protection, support and movement of the human body.  
- Relate the structure of the integumentary system to its functional role in protecting the body and maintaining homeostasis.

Standards:  
SAP 3: Students will assess the integration and coordination of body functions and their dependence on the endocrine and nervous systems to regulate physiological activities.  
- Interpret interactions among hormones, senses, and nerves which make

Standards:  
SAP 4: Students will analyze the physical, chemical, and biological properties of process systems as these relate to transportation, absorption and excretion, including the cardiovascular, respiratory, digestive, excretory and immune systems.  
- Describe the chemical and physical mechanisms of
whole.

- Explain the role of homeostasis & its mechanisms as it relates to the body as a whole & predict the consequences of the failure to maintain homeostasis.
- Relate cellular metabolism & transport to homeostasis & cellular reproduction.
- Describe how structure and function are related in terms of cell and tissue types.

SAP 3: Students will assess the integration and coordination of body functions and their dependence on the endocrine and nervous systems to regulate physiological activities.

- Interpret interactions among hormones, senses, and nerves which make possible the coordination of functions of the body.
- Investigate the physiology of electrochemical impulses and neural integration and trace the pathway of an impulse, relating biochemical changes involved in the conduction of the impulse.
- Describe how the body perceives internal and external stimuli and responds to maintain a stable internal environment, as it relates to biofeedback.

SAP 4: Students will analyze the physical, chemical, and biological properties of process systems as these relate to transportation, absorption and excretion, including the cardiovascular, respiratory, digestive, excretory and immune systems.

- Describe the chemical and physical mechanisms of digestion, elimination, transportation, and absorption within the body to change food and derive energy.
- Analyze, and explain the relationships between the respiratory and cardiovascular systems as they obtain oxygen needed for the oxidation of nutrients and removal of carbon dioxide.
- Analyze the basic structures and functions of the respiratory system.
- Differentiate between the upper and lower respiratory tract while tracing the pathway of air into and out of the respiratory system.
- Explain the physiology of breathing, to include the process of gas exchange.
- Relate the role of the urinary system to regulation of body wastes (i.e., water, electrolyte balance, volume of body fluids).
- Analyze the basic structures and functions of the urinary system.
- Describe the structure and function of the nephron, and explain the processes
| Energy.  
| Analyze the basic structures and functions of the cardiovascular system.  
| Describe components of blood, and the functions of each.  
| Identify and describe the functions of the chambers, valves, and associated vessels of the heart.  
| Distinguish the differences in anatomy of blood vessels to include arteries, arterioles, capillaries, venules, and veins.  
| Identify and trace the flow of blood through the heart, and provide distinction between the pulmonary and systemic circulation.  
| Analyze, and explain the relationships between the respiratory and cardiovascular systems as they obtain oxygen needed for the oxidation of nutrients and removal of carbon dioxide.  
| Examine various conditions that change normal body functions (e.g. tissue rejection, allergies, injury, diseases and disorders) and how the body responds.  
| Describe the effects of aging on body systems.  
| Identify and describe the functions of the chambers, valves, and associated vessels of the heart.  
| Distinguish the differences in anatomy of blood vessels to include arteries, arterioles, capillaries, venules, and veins.  
| Identify and trace the flow of blood through the heart, and provide distinction between the pulmonary and systemic circulation.  
| Analyze, and explain the relationships between the respiratory and cardiovascular systems as they obtain oxygen needed for the oxidation of nutrients and removal of carbon dioxide.  
| Examine various conditions that change normal body functions (e.g. tissue rejection, allergies, injury, diseases and disorders) and how the body responds.  
| Describe the effects of aging on body systems.  
| Analyze the basic structures and functions of the lymphatic system.  
| Explain the relationship between the lymphatic and circulatory system.  
| Analyze and identify the basic structures and functions of the immune system.  
| Compare and contrast the types of immunity and identify the relationships of the white blood cells.  
| Describe the effects of aging on body systems.  
| Analyze the role of the reproductive system as it pertains to the growth and development of humans.  
| Analyze the basic structures and functions of the reproductive system.  
| Compare and contrast the female reproductive system.  

**SAP5:** Students will analyze the role of the reproductive system as it pertains to the growth and development of humans.
Learning Intentions | Learning Intentions | Learning Intentions | Learning Intentions |
---|---|---|---|
- Differentiate between anatomy and physiology and begin to notice patterns of how aging on body systems. with the reproductive system of the male. - Explain how the functions of the reproductive organs are regulated by hormonal interactions. - Describe the stages of human embryology and gestation including investigation of gestational and congenital disorders (e.g. ectopic pregnancy, miscarriage, cleft palate, hydrocephaly, fetal alcohol syndrome). - Describe the stages of development from birth to adulthood (i.e. neonatal period, infancy, childhood, adolescence and puberty, and maturity). | - How do the structures of the integumentary system relate to its functions to maintain | - What are the structures and functions involved in our special senses (vision, | - How does the respiratory and cardiovascular systems work together to obtain
- Understand homeostasis and its importance for survival and its role in diseases.
- Describe the parts of the homeostatic mechanism and explain how they function together.
- Know the locations of body organs in body cavities.
- Understand why anatomical position and directional terms are fundamental to being able to communicate accurately about body structures and locations.
- Demonstrate and properly use the terms that describe relative positions, body sections, and body regions.
- Identify the biological levels of organization and the characteristics of each.
- Understand the basic homeostatic mechanisms of blood pH.
- Discuss the pH scale and understand where body fluids fit on the scale.
- Know phospholipid structure and properties.
- Discuss the organic and inorganic substances needed for life.
- Identify macromolecules in food choices.
- Contrast covalent, hydrogen, ionic, and peptide bonds.
- Compare and contrast cell homeostasis?
- How do the structures of the skeletal system relate to its functions to carry out and maintain homeostasis?
- Compare the axial and appendicular skeletons.
- Explain the different types of ossification.
- Classify joints according to structure and function, describe their characteristics, and give an example of each.
- How do the structures of the muscular system relate to the functions of the system?
- Identify the major types of muscles in the body as well as examples of each.
- How do skeletal muscles contract?
- How is the nervous system organized and what are its functions?
- How is an electrical impulse transmitted in the nervous system?
- How does an electrical signal turn into a chemical signal at the neuromuscular junction?
- How does the body sense its environment, process this information, and respond to maintain homeostasis?
- What are the cranial nerve names and functions?
- What are the differences between the central and peripheral nervous systems?
- What hormones are secreted by each endocrine gland and what are the functions of these hormones?
- Why is the hypothalamus so important? How is it the link between the endocrine and nervous systems?
- How does blood flow through the heart into the body?
- Analyze the basic structures and functions of the cardiovascular system.
- Describe components of blood, and the functions of each.
- Identify and describe the functions of the chambers, valves, and associated vessels of the heart.
- Distinguish the differences in anatomy of blood vessels to include arteries, arterioles, capillaries, venules, and veins.
- oxygen needed for the oxidation of nutrients and removal of carbon dioxide?
- Identify and locate the major parts of the heart and discuss the functions of each part.
- Discuss the cardiac cycle and the cardiac conduction system. Explain how the cardiac cycle is controlled.
- Compare the structures and functions of the major types of blood vessels.
- Describe how substances are exchanged between blood and capillaries and surrounding tissue.
- Describe the location and function of each organ in the respiratory system.
- Discuss how various factors affect the respiratory areas.
- List the ways blood transports oxygen and carbon dioxide.
- Identify the locations of the major lymphatic pathways.
- Describe how tissue fluid and lymph form and explain the function of lymph.
- Discuss the locations and functions of the endocrine system.
- Analyze processes by which a cell maintains homeostasis.
- Compare and contrast various ways that substances move through cell membranes.
- Describe each type of organelle and explain its function.
- State the general functions of enzymes and explain how enzymes control metabolic reactions.
- Explain how cellular respiration releases energy.
- Differentiate between ADP and ATP, describing the structure and function of each.
- Differentiate between DNA and RNA, explaining how nucleic acids store and carry genetic information.
- List the four major tissue types and tell where each is located in the body.
- Differentiate between different types of tissue using a microscope.
- Describe the general characteristics, functions and classification of epithelial tissue in terms of shape and cell layers.
- Name the types of epithelium, and for each type, identify an organ in which that type is found.
- Compare/contrast loose and peripheral nervous systems?
- What is the basic structure and functions of the various parts/lobes of the brain?
- Name the major organs of the digestive system and their functions.
- Describe and explain structures of the mouth and teeth.
- Describe how digestive secretions are regulated.
- How are the products of digestion absorbed.
- Describe the location, structure and function of the kidneys.
- Trace the pathway of blood through the major vessels in the kidney.
- Describe a nephron and explain the role of glomerular filtration.
- Describe the structure of the ureters, urinary bladder and urethra.
- What are the main anatomical features of the male and female reproductive system?
- How do the pituitary and sex hormones control the production of gametes and the sexual response?
- What changes occur within a mother and developing
dense connective tissue.

- Compare/contrast muscle tissue types.
- Describe the general characteristics of nervous tissue.

**Essential Vocabulary:**
Anatomy, physiology, homeostasis, metabolism
Directional terms
Structure = function
Macromolecules - carbohydrates, lipids, proteins, nucleic acids
Organelles - nucleus, golgi bodies, ribosomes, cytoplasm, endoplasmic reticulum, vesicles,

**Essential Vocabulary:**
**Integumentary System** (structures and functions)
**Skeletal System** (structures and functions)
axial and appendicular skeletons
Ossification
Hemopoiesis

**Essential Vocabulary:**
**Endocrine system** (structures and functions)
Hormone
Hypothalamus
**Cardiovascular System** (structures and functions)
bradycardia
Diastolic
Electrocardiogram

**Essential Vocabulary:**
**Respiratory System** (structures and functions)
Alveolus
Epiglottis
**Immune System** (structures and functions)
Allergen
humoral immunity

child during the prenatal and postnatal period?
- What factors can increase the risk of defects in a developing child and what are some examples of these defects?
- What changes occur within an individual during each life stage from birth to senescence?
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<thead>
<tr>
<th>cell membrane, lysosome, mitochondria</th>
<th>Joints</th>
<th>papillary muscle, syncytium, systolic tachycardia</th>
<th>Immunity</th>
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<tr>
<td>Passive transport mechanisms - diffusion, osmosis, facilitated diffusion</td>
<td>Passive transport mechanisms - active transport, endocytosis, phagocytosis, pinocytosis, receptor-mediated endocytosis, exocytosis</td>
<td>Cell membrane, lysosome, mitochondria</td>
<td>Inflammation</td>
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<td>Active transport mechanisms - active transport, endocytosis, phagocytosis, pinocytosis, receptor-mediated endocytosis, exocytosis</td>
<td>Cellular respiration, DNA, RNA, DNA replication, Protein synthesis</td>
<td>Joints</td>
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<td>Skeletal, Cardiac and Smooth Muscle</td>
<td>Muscular System (structures and functions)</td>
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<td>Electrochemical impulses</td>
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<td>Chyme</td>
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<td>deciduous teeth</td>
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<td>Peripheral nervous system</td>
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<td>Neuron</td>
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<td>Neuromuscular junction</td>
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<td>renal cortex, glomerulus</td>
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<td>● Stem Cell Current Event: Research Article on Current Stem Cell Research</td>
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<td>● Strange But True: Drinking Too Much Water Can Kill - SCIENTIFIC AMERICAN</td>
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<td>● Disease Research Project</td>
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<td>● Brain Dissection</td>
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<td>● Eye Dissection</td>
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<td>● Case Study: The Hot Tub Mystery (Cardiovascular)</td>
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<td>● Driving can be dangerous to your health: A case study in physiology (Respiratory system)</td>
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<td>● The Vaccine Debate</td>
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<td>● Pregnancy journal (keep track of changes that would be occurring within the mother and developing child)</td>
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<td>● Dissection</td>
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<td>● Analyze the “Miracle of Life”</td>
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*Each unit integrates laboratory experiences and field work using the process of inquiry. There are several strategies that are common throughout the units such as the use of a laboratory notebook, written lab reports, common teaching strategies, and written assignments relative to technical and seminal documents. Lab safety is stressed in all practical situations. Many standards are recursive in nature and will be revisited in different units throughout the year.*

**Resources** [www.georgiastandards.org](http://www.georgiastandards.org)