

HUDSONVILLE HIGH SCHOOL COURSE FRAMEWORK



COURSE / SUBJECT

Human Anatomy and Physiology

KEY COURSE OBJECTIVES/ENDURING UNDERSTANDINGS Important ideas and core processes	UNIT PACING Names of units and approximate pacing	UNIT LEARNING TARGETS By the end of the unit, students will be able to...
Human Body Tissues	Chapter 4 - 5 days	<ul style="list-style-type: none"> - Identify the structure and functions of the four tissue types - Classify tissues on the basis of arrangement and structure - Describe characteristics of all epithelial tissue, connective tissue, muscle and nerve tissue. - Explain locations in the body where the different tissues can be found. - Describe the common embryological origin of all tissue types.
Cell Biology	Chapter 3 - 5 days	<ul style="list-style-type: none"> - Describe the structure and function of the cell membrane. - Compare and contrast transport mechanisms in the cell. - Explain mechanisms of vesicular transport. - Describe the structure and function of all animal cell organelles. - Explain the process of DNA replication and its role in the cell cycle. - Describe how the endomembrane system functions in protein synthesis and export.
Chemistry	Chapter 2 - 4 days	<ul style="list-style-type: none"> - Describe basic atomic structure. - Explain how various types of bonds form. - Describe the carbonic acid/bicarbonate buffer system. - Describe the properties of all organic molecules. - Explain dehydration synthesis and hydrolysis. - Identify the structure and function of all classes of organic molecules.

Integumentary System	Chapter 5 - 5 days	<ul style="list-style-type: none"> - Identify the three major regions of the skin including the types of cells found within each. - Describe the functions of the various cells within all skin layers. - Identify the pigments which contribute to skin color. - Describe the major types of skin cancer and how they develop. - Explain various functions of the integumentary system. - Describe the different types of sweat glands and what they produce. - Describe hair function and distribution. - Explain developmental aspects of the integument.
Skeletal System (Bones and Joints)	Chapter 6 and 8 - 7 days	<ul style="list-style-type: none"> - Describe characteristics of the different types of cartilage and where they are found. - Explain how cartilage grows, ossifies and becomes bone. - Describe the classifications of bones and their functions. - Describe the gross anatomy of bones. - Describe the microstructure of bones. - Describe bone growth and remodeling and the influence of hormones on the process. - Identify types of bone fractures. - Describe the stages of healing of a bone fracture. - Explain how joints are classified. - Describe sprains, cartilage injuries, dislocations and degenerative conditions of joints.
Muscular System	Chapter 9 - 7 days	<ul style="list-style-type: none"> - Describe the three types of muscle tissue and how they differ in structure, location, function and means of activation. - Explain similarities in muscle tissue. - Describe the many parts of a sarcomere. - Explain the events at the neuromuscular junction. - Describe action potentials and how they are generated and propagated. - Explain excitation - contraction coupling. - Describe how muscles respond to varying stimuli strength. - Distinguish between oxidative and glycolytic muscle fibers. - Describe the effect of exercise on different muscle types. - Identify the various ways muscles get energy.

Nervous System	Chapter 11 - 6 days	<ul style="list-style-type: none"> - Describe functions of the nervous system and its basic organization. - Describe the histology of nerve tissue and the supporting cells. - Describe axon structure and function. - Explain how nerves are classified. - Describe how ion channels are involved in the establishment and propagation of membrane potentials. - Differentiate between graded and action potentials. - Explain the events that occur at a synapse and the role of neurotransmitters.
Special Senses	Chapter 15 - 5 days	<ul style="list-style-type: none"> - Describe the anatomy and physiology of the eye. - Explain the functional anatomy of phototransduction. - Describe the physiology of the smell and taste. - Describe the anatomy and physiology of the ear. - Explain auditory transduction.
Endocrine System	Chapter 17 - 6 days	<ul style="list-style-type: none"> - Describe the difference between endocrine and exocrine glands. - Explain how autocrine and paracrine glands are the same and how they are different. - Describe the different types of hormones and their actions. - Explain how humoral and neural stimuli impact hormone release. - List the major endocrine organs, their secretions and the function of each secretion. - Describe how the heart, skin, kidneys, GI tract, placenta and adipose tissue act as hormone producing structures.
Lymphatic System	Chapter 20 - 5 days	<ul style="list-style-type: none"> - Describe the structure and function of lymphatic vessels and capillaries. - Discuss the major cells of the lymphatic system and their function. - Explain the structure and function of lymph nodes. - Describe how the spleen, thymus, tonsils and MALT serve lymphatic functions. - Discuss developmental aspects of the system.

Blood	Chapter 17 - 6 days	<ul style="list-style-type: none"> - Describe the pathway of circulation in the body (name all heart chambers, valves and major arteries and veins connecting to the heart). - Discuss the composition of blood and its functions. - Describe the formed elements of blood and their functions. - Explain erythropoiesis and its regulation. - Describe the fate and destruction of erythrocytes. - Describe various blood disorders. - Differentiate between the different types of leukocytes on the basis of structure and function. - Describe the sequential events of hemostasis. - Describe the human blood groups including Rh blood groups.
Heart and Blood Vessels	Chapter 18 - 19 - 5 days	<ul style="list-style-type: none"> - Describe the anatomy of the heart. - Describe the pathway through the heart and lungs. - Discuss cardiac muscle contraction and state how it is different than other muscle types. - Discuss cardiac output and congestive heart failure. - Explain developmental aspects of the heart. - Describe the generalized structure of blood vessels as well as adaptations in the different types. - Describe blood flow through capillary beds. - Describe resistance factors, blood pressure and controls on blood pressure. - Explain blood flow through various parts of the body.
Respiratory System	Chapter 22 - 6 days	<ul style="list-style-type: none"> - Describe the major functions of the respiratory system. - Describe the structures of the respiratory system. - Explain the respiratory membrane. - Describe the pressure relationships in the thoracic cavity. - Explain the mechanics of ventilation in relation to gas laws. - Explain ventilation - perfusion coupling. - Describe how gases are loaded and unloaded from the blood. - Describe respiratory adjustments to exercise and altitude.

Digestive System	Chapter 23 - 5 days	<ul style="list-style-type: none"> - Describe the classification and structure of teeth. - Explain the digestive pathway. - Discuss which food types are broken down by which enzymes and in which location in the GI tract. - Describe common disorders of the esophagus, stomach, liver, gall bladder, pancreas and intestines. - Describe the role of the bacterial flora in the GI tract and how they are controlled.
Urinary System	Chapter 25 - 4 days	<ul style="list-style-type: none"> - Describe the organs of the urinary system and their functions. - Discuss the structural and functional anatomy of a nephron. - Describe the mechanisms of urine formation. - Explain the extrinsic and intrinsic controls on urine formation. - Describe developmental aspects of the urinary system.
Immune System	Chapter 21 - 8 days	<ul style="list-style-type: none"> - Differentiate between innate and adaptive defenses in the body. - Describe the inflammatory response. - Describe the role of complement and a fever in immunity. - Describe antigens and antigenic determinants. - Discuss the various cells of the adaptive immune system. - Explain the humoral response and clonal selection. - Describe passive and active immunity. - Describe the cell mediated response and the importance of the various types of T cells. - Describe immunodeficiencies and hypersensitivities.
Reproductive System	Chapter 27 - 6 days	<ul style="list-style-type: none"> - Describe male reproductive anatomy and physiology. - Discuss the human life cycle (including the process of meiosis). - Describe female reproductive anatomy and physiology. - Explain the menstrual and ovarian cycles. - Discuss various sexually transmitted diseases. - Explain developmental aspects of the reproductive system.

Pregnancy and Development	Chapter 28 - 5 days	<ul style="list-style-type: none"> - Describe the acrosomal reaction and the process of fertilization. - Describe pre-embryonic development. - Explain implantation and placentation. - Describe the development of the fetal circulation. - Describe the various stages of labor.
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OVERARCHING/ESSENTIAL SKILLS OR QUESTIONS			
Histology	Weeks 1-5	Identify common tissue histology.	Laboratory examination of prepared slides using multiple resource materials for reference.
Skeletal Anatomy	Weeks 6-11	Identify landmarks on all of the major bones of the body.	Laboratory examination of cat bones using multiple resource materials for reference.
Body Musculature	Weeks 13 - 17	Identify the major muscles of the body including their origin, insertion, and action.	Laboratory examination of preserved cat specimens using multiple resource materials for reference.
Internal Anatomy	Weeks 18 - 23	Identify the major organs of the body including the vasculature.	Laboratory examination of preserved cat specimens using multiple resource materials for reference.