PHYSIOLOGY

UNIT 1: CELLS, SENSORY ORGANS, & BLOOD

- **Section 1.1: Cellular Function**
- **Section 1.2: Sensory Organs**
- **Section 1.3: Functions of Blood**

Learning Objectives

- Identify cell parts
- Define parts of the cell
- Differentiate between mitosis and meiosis
- Describe the characteristics of each phase of cell division
- Compare and contrast the processes of meiosis and mitosis
- Summarize how genes are inherited from parent to child
- Illustrate how osmosis operates
- Differentiate between facilitated transport and active transport
- Differentiate between poor color vision and colorblindness
- Discuss how to prevent hearing loss
- Describe what a deviated septum is and the resulting symptoms
- Explain what sound is
- Describe the process of hearing
- Discuss the process of smelling
- Recognize when and why olfactory fatigue occurs
- Identify the structures within the eye that make vision possible
- Summarize how vision works
- Describe blood related issues
- List treatment options for blood related issues
- Describe how platelets work to form a platelet plug
- Summarize how clotting proteins form a blood clot
- Differentiate between the different blood types in the ABO blood group
- Explain why blood typing is important
- Discuss the components of blood

- Examine how blood transports materials throughout the body
- Discuss the elements within plasma
- Examine the components and function of red blood cells
- List the types and functions of white blood cells

UNIT 2: CIRCULATORY & RESPIRATORY SYSTEMS

- **Section 2.1: Lymphatic System & Immunity**
- **Section 2.2: Circulatory System**
- **Section 2.3: Respiratory System**

Learning Objectives:

- Describe how cell-mediated immunity works
- Differentiate between the different types of immunity
- Identify the structures within the lymphatic system
- Discuss the primary functions of the lymphatic system
- Examine nonspecific defenses and discuss how they help prevent infections
- Summarize the inflammatory response
- Summarize antibody mediated immunity
- Identify the different types of B cells
- Describe HIV/AIDS, allergies, and lupus
- Discuss symptoms and treatments of HIV/AIDS, allergies, and lupus
- Identify the function of the cardiovascular system
- Describe the components of the cardiovascular system
- Demonstrate how the cardiac cycle works
- Explain how you can hear, feel, and see the cardiac cycle
- Summarize how blood circulates through the heart
- Discuss how blood flows to the lungs
- Illustrate how the blood travels to the body
- Describe circulatory issues
- Take preventive measures to avoid developing circulatory issues
- Describe the difference between external and internal respiration
- Contrast mountain sickness and decompression sickness

- Discuss causes of a few respiratory issues
- Compare and contrast the symptoms and treatment options of a few respiratory issues
- Describe the process of inspiration
- Diagram what occurs during expiration
- Identify the primary functions of the respiratory system
- Describe the structures within the respiratory system

UNIT 3: NERVOUS & DIGESTIVE SYSTEM

- **Section 3.1: Nervous System I**
- **Section 3.2: Nervous System II**
- **Section 3.3: Digestive System**

Learning Objectives:

- Describe the risk factors of epilepsy, Alzheimer's disease, and Parkinson's disease
- Discuss the symptoms of epilepsy, Alzheimer's disease, and Parkinson's disease
- Identify the structures and functions of the central nervous system
- Describe the functions of each section of the brain
- Determine the functions of the peripheral nervous system
- Formulate how the PNS is divided
- Analyze the functions and structures of the nervous system
- Illustrate and describe the functions of different types of neurons
- Discuss symptoms, risk factors, and treatment of nervous system issues
- Apply preventive measures against tetanus and concussions
- Describe how a nerve impulse occurs
- Diagram the changes within and surrounding the nerve cell membrane during an action potential
- Analyze the components of a nerve synapse
- Break down into 4 steps the transmission of nerve impulses across the synaptic cleft

- Compare and contrast the effects of different chemicals and drugs
- Differentiate between physical and psychological effects
- Discuss the essential nutrients the body needs
- Contrast between the essential nutrients that act as an energy source for the body
- Recall the structures within the digestive system
- Contrast the processes that prepare food for cellular utilization
- Define and analyze obesity
- Evaluate effective weight management strategies
- Examine how the organs of the digestive system aid in digestion
- Describe how the accessory organs operate to help with digestion

UNIT 4: MUSCULOSKELETAL SYSTEMS

- **Section 4.1: Skeletal System & Joints**
- **Section 4.2: Muscular System**
- **Section 4.3: Energy Systems**

Learning Objectives:

- Compare and contrast different types of fractures
- Apply preventive measures against fractures
- Describe the functions of the skeletal system
- Elaborate on the different classifications of joints
- Differentiate between the different classifications of levers
- Illustrate how levers work in the human body
- Summarize how bone formation occurs
- Elaborate on the process of bone remodeling
- Formulate how the functions of muscle aid the body
- Compare and contrast the different types of muscle
- Characterize skeletal muscle groups, muscles, and muscle fibers
- Classify types of contractions
- Support regular exercise for most individuals

- Demonstrate how exercise effects skeletal and cardiac muscles
- Break down the contraction cycle into seven steps
- Illustrate why muscle fiber innervations is important
- Compare and contrast the three main energy sources
- Rank the three main energy sources according to their power and duration
- Differentiate between the abilities of the three main energy source

UNIT 5: URINARY, ENDOCRINE, & REPRODUCTIVE SYSTEMS

- **Section 5.1: Urinary System**
- **Section 5.2: Endocrine System**
- **Section 5.3: Reproductive System**

Learning Objectives:

- Explain when parents have reason to worry about their child's bed-wetting
- Discuss the symptoms, treatment, and prevention of chronic kidney disease and urinary tract infections
- Describe how the body excretes metabolic wastes
- Diagram the structures of the urinary system
- Analyze how the kidneys regulate blood volume and blood pressure
- Formulate how the kidneys maintain a balance of salt and water levels
- Outline how the kidneys control the pH balance of the blood
- Identify the structures that aid in urine formation
- Analyze the processes that form urine
- Derive how the hormones secreted by the thyroid gland affect the body
- Outline the functions of the parathyroid glands
- Demonstrate how the thymus gland aids the immune system
- Analyze the functions of the pancreas
- Compare and contrast between type I & type II diabetes
- Classify the glands of body as either exocrine glands or endocrine glands

- Identify the principal endocrine glands of the body and the hormones they secrete
- Generate a description of the 9 hormones secreted by the pituitary gland
- Summarize the function of the pineal gland
- Classify hormones produced by the adrenal cortex according to its function.
- Describe how hormones respond during the Fight-or-Flight Response
- Analyze the hormones produced by the adrenal medulla
- Analyze the effects of the male sex hormone testosterone
- Compare and contrast the ovarian and uterine cycles
- Outline the effects of the female sex hormones estrogen and progesterone
- Discuss infertility in relation to both men and women
- Describe endometriosis and polycystic ovary syndrome
- Discuss the process of spermatogenesis and male reproductive functions
- Summarize the process of oogenesis and female reproductive functions