Allied Health

ANATOMY & PHYSIOLOGY I

Level III Unit Outline

Unit 1: Safety and School Rules

- Safety drills, first aid, classroom and shop rules.
- The importance of safety in the CTE environment.
- What to do in the case of an emergency.

Unit 2: Environmental Health & Safety- Promotion of Safety

- Explain infection control procedures.
- Demonstrate personal safety practices.
- Use techniques to ensure environmental safety.
- Identify common safety hazards.
- Describe healthy and safety behaviors.
- Utilize emergency procedures and protocols.
- Apply techniques for patient/ client safety when positioning, transferring and transporting patients / clients.
- Use equipment for positioning, transferring and transporting patients / clients safely.
- Employ techniques for effectively communicating health/medical information within legal/regulatory guidelines.
- Employ techniques for confidentially communicating health/medical information within legal/regulatory guidelines.
- Perform cleaning and decontamination tasks using the best practices for eliminating pathogenic organisms.
- Employ best safety practices for handling hazardous materials and managing waste.
- Employ best safety practices for handling and storing a variety of materials common to the health services environment.

Unit 3: Environmental Health & Safety- Infection Control

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Unit 4: Chemistry of Life

- Define states of matter in relation to human organisms.
- List major, minor, and trace elements in the human body and their functions.
- Define and explain atomic structure, concept of valence, ions, molecules, free radicals, electrolytes, and isotopes in relation to human physiological processes.
- Explain creation of chemical bonds and their significance in functions of biological molecules.
- Define and be able to write and read the equations of basic chemical reactions.
- Identify solutions, suspensions, and colloids in the body.
- Identify pH of body fluids and mechanisms and consequences of pH shifts.
- Differentiate between organic and inorganic compounds.
- Define properties of carbon atoms.
- Define chemical structure, types, and functions of carbohydrates.
- Define chemical structure, types and functions of lipids, lipoproteins, prostaglandins, fat-soluble vitamins.
- Differentiate between saturated and unsaturated fats, cis- and trans-forms, effect of hydrogenation on properties and metabolism of lipids.
- Define chemical nature, levels of structure, types and functions of proteins.
- Explain the process of denaturing of proteins and factors causing denaturing.
- Define properties and functions of enzymes and explain the mechanism of enzyme action using the key-and-lock concept.
- Define the structure and functions of nucleic acids and ATP as a nucleotide.
- Explain the mechanisms and purpose of reactions of dehydration synthesis and hydrolysis.
- Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Unit 5: Cellular Structures, Cell Membrane and Transport

- Identify the structures of a typical cell and their major functions.
- Explain with examples how the composition and number of organelles corresponds with the specialization of a cell.
- Define structural composition of a plasma membrane and correlate the structures to the functions performed.
- Define and apply concepts of selective permeability and fluidity.
- Define and differentiate between passive and active transport across the membrane.
- Define factors affecting diffusion through membrane.
- Differentiate between mechanisms of simple diffusion, facilitated diffusion, and osmosis and give examples of substances that are transported by each of these processes.

- Explain the concept of tonicity and predict the effects of isotonic, hypertonic, and hypotonic solutions on human cells and overall homeostasis.
- Differentiate between primary active transport, secondary active transport, and transport and vesicles and give examples of physiological functions dependent on these processes.
- Explain in detail the mechanism of receptor-mediated endocytosis, phagocytosis, pinocytosis, exocytosis, and transcytosis.
- Explain the principle and purpose of dialysis for patients with kidney failure.
- Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
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Unit 6: Histology

- Describe stages of embryonic development.
- Define three germ layers and types of tissues originating from each.
- Describe four types of cell junctions and give examples of tissues in which the cells are connected with each type of junction.
- Describe major types of epithelial tissue and correlate the structure with function and location in the body.
- Describe glands and classify them by function.
- Describe major types of connective tissue including cellular and non-cellular components, functions, and locations.
- Describe muscular tissue including structure, functions, and locations.
- Describe nervous tissue including major and supportive components, functions, and locations.
- Using a microscope, identify the tissue presented on an unlabeled slide and predict the body location from which the slide was made.
- Describe the processes of tissue regeneration and repair for each tissue type.
- Describe in detail the phases and events of wound healing involving epithelial and connective tissues.
- Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Unit 7: Integumentary

- Describe cells found in epidermis and their functions; define composition and functions of epidermal strata.
- Describe composition of dermal regions and their functions.
- Describe structure and function of hypodermis.
- Define structure and function of epidermal ridges.
- Identify pigments responsible for the skin color and cells producing the pigments.
- Explain the use of skin color as a diagnostic clue for identifying health conditions.
- Describe the structures and functions of hair and the hair growth cycle.
- Describe the structures and functions of nails.

- Describe the functions and structure and identify as merocrine, apocrine, or holocrine, sebaceous, ceruminous, and sweat glands.
- Differentiate between thick and thin skin.
- Correlate the structures of the skin with its six major functions.
- Describe types of skin cancers and explains signs to be watched in development of malignant melanomas.
- Describe the characteristics of burns of different degrees and their local and systemic effects; explain the use of the rule of nines.
- Describe causes, characteristics and prevention of pressure ulcers and dermatitis of various natures.
- Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
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Unit 8: Skeletal System

- Define the division of the skeletal system into axial and appendicular skeletons.
- Define functions of bones.
- Describe characteristics, functions and locations of spongy and compact bone tissue.
- Classify bones by shape.
- Identify parts of a generalized long bone.
- Describe composition of a bone matrix and identify the cells in osseous tissue.
- Describe and apply on practice nomenclature of bone markings.
- Describe the process of intramembranous and endochondral ossification in an embryo.
- Describe the process of bone growth after birth.
- Describe the events of bone remodeling.
- Distinguish major types of bone fractures.
- Describe steps and events of fracture repair.
- Define factors affecting bone growth and repair.
- Describe regulation of calcium deposition and release from bones.
- Describe causes, symptoms, and treatment of major bone pathological conditions, such as osteoporosis and rickets.
- Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis

Unit 9: Muscular System

- The structure and function of the three types of muscle tissue.
- Microscopic anatomy of skeletal muscle.
- The role of actin and myosin in muscle physiology.
- The key steps involved in the contraction of skeletal muscle fiber.
- How muscles are named.

- The similarities of aerobic and anaerobic endurance.
- What produces muscle fatigue.
- The difference between an isotonic and isometric contraction.
- Various diseases associated with muscles of the body.

Unit 10: Blood

- The process of hematopoiesis.
- The functions of the blood.
- The composition and physical characteristics of whole blood.
- The composition of plasma and their functions.
- The function and structure of the erythrocytes, leukocytes and thrombocytes.
- Example of blood cell disorders.
- The steps of hemostasis.
- The regulatory and protective functions of blood.

Unit 11: Blood Vessels and the Heart

- The pathway of blood flow through the heart.
- The major blood vessels and heart valves.
- The conducting system of the heart
- The different paths of pulmonary and systemic circulation.
- The parts of a cardiac cycle.
- The 3 layers forming the walls of the blood vessels and the function of each.
- The difference in structure and function of the arteries, capillaries and veins.
- What blood pressure is and how it is determined.
- The factors that influence blood pressure.
- Disorders of the cardiovascular system.
- The path that blood travels as it moves through the major arteries and veins of the body. The factors involved in capillary and cell dynamics.

Unit 12: Respiratory System

- The function of each organ in the respiratory system.
- The protective mechanisms of the respiratory system.
- The structure and function of the lungs and pleural coverings?
- The four events in respiration.
- The relationship between volume changes and breathing.
- The different types of respiratory volumes.
- How gas exchange occurs in the lungs and tissues.
- How oxygen and carbon dioxide are transported in the blood.
- Why a person cannot voluntarily stop breathing.
- Various physical, chemical and emotional factors that affect respiratory rate.
- Symptoms and causes of the following respiratory diseases: emphysema, chronic bronchitis, and lung cancer.

Unit 13: The Nervous System- Peripheral, Central, & Sensory Systems

- Explain the anatomical and functional classification of the nervous system.
- Identify the functions of neurons and neuroglia.
- Draw a neuron, label its parts, and give the functions of each.
- Classify three types of neurons in terms of their function.
- List the events that lead to the generation of a nerve impulse.
- Describe the four basic processes on which all neural responses depend.
- Describe a reflex arc and explain how it is carried out by the nervous system.
- List at least four types of sensory receptors and describe the functions of each.
- Name the major parts of the brain and describe the functions of each.
- Describe the coverings of the brain and spinal cord and describe how it is protected.
- Discuss the formation and function of cerebrospinal fluid.
- Describe the structure of the spinal cord and list two important functions.
- List the major parts of the peripheral nervous system.
- Name and describe the major plexuses.
- Name the cranial nerves and list their major functions.
- Explain how spinal nerves are named and describe their function.
- Describe the structure of a typical spinal nerve.
- List and describe the subdivisions of the autonomic and limbic nervous systems.
- Compare and contrast the sympathetic with the parasympathetic.
- Contrast the somatic and autonomic divisions of the peripheral nervous system.
- Describe the sensory receptors associated with pressure, temperature, and pain.
- Explain how the sensation of pain is produced.
- List and describe disease/disorders associated with the nervous system.
- Define important terminology of the nervous system

Unit 14: Professionalism- Career Portfolio Update

- How to properly identify and a good vs bad resume and cover letter sample.
- Create a professional portfolio based on the rubric provided.
- How to tailor their portfolio to a specific career.
- Learn how to research job posting.
- How to align career requirements with experience.
- How to market themselves.

Allied Health

ANATOMY & PHYSIOLOGY I

New Jersey Student Learning Standards (NJSLS)

NJSLS: CTE.9.3

CONTENT AREA:	***9.3 CAREER AND TECHNICAL EDUCATION***
HEALTH SCIENCE CAREER CLUSTER	
Number	**Standard Statement**
By the end of Grade 12, Career and Technical Education Program completers will be able to:	
CAREER CLUSTER®:	**HEALTH SCIENCE (HL)**
9.3.HL.1	Determine academic subject matter, in addition to high school graduation requirements, necessary for pursuing a health science career.
9.3.HL.2	Explain the healthcare workers' role within their department, their organization and the overall healthcare system
9.3.HL.3	Identify existing and potential hazards to clients, coworkers, visitors and self in the healthcare workplace
9.3.HL.4	Evaluate the roles and responsibilities of individual members as part of the healthcare team and explain their role in promoting the delivery of quality health care.
9.3.HL.5	Analyze the legal and ethical responsibilities, limitations and implications of actions within the healthcare workplace.
9.3.HL.6	Evaluate accepted ethical practices with respect to cultural, social and ethnic differences within the healthcare workplace.
CAREER CLUSTER®:	**HEALTH SCIENCE (HL)**
PATHWAY	**HEALTH INFORMATICS (HL-HI)**
9.3.HL-HI.1	Communicate health information accurately and within legal and regulatory guidelines, upholding the strictest standards of confidentiality.
9.3.HL-HI.2	Describe the content and diverse uses of health information.
9.3.HL-HI.3	Demonstrate the use of systems used to capture, retrieve and maintain confidential health information from internal and external sources.
CAREER CLUSTER®:	**HEALTH SCIENCE (HL)**
PATHWAY	**THERAPEUTIC SERVICES HL-THR**
9.3.HL-THR.1	Utilize communication strategies to answer patient/client questions and concerns on planned procedures and goals.
9.3.HL-THR.2	Communicate patient/client information among healthcare team members to facilitate a team approach to patient care.

9.3.HL-THR.3	Utilize processes for assessing, monitoring and reporting patient's/clients' health status to the treatment team within protocol and scope of practice.
9.3.HL-THR.4	Evaluate patient/client needs, strengths and problems in order to determine if treatment goals are being met.