

The following list of objectives have been derived from many of the currently available resources in anatomy and physiology instruction that are typically part of allied health educational programs or other non-science curricula. The objectives that are listed below are in common with most of these programs. Paramedic education program should select courses or textbooks which cover this level of material.

OBJECTIVES:

Define anatomy, physiology, and pathophysiology

Name the levels of organization of the body and explain each

Name the organ systems of the body

Define homeostasis and give an example of a typical homeostatic mechanism

Describe the anatomical position

Describe the sagittal, midsagittal, transverse and frontal planes

Use proper terminology to describe the location of body parts with respect to one another

Name the body cavities, their membranes and some organs within each cavity

Explain the four quadrants of the abdomen and name the organs in those areas

Define matter, element, atom, proton, neutron, and electron

Using symbols, name some common elements found in the body

Describe the purpose of ionic, covalent and hydrogen bonds in the body

Describe what happens in synthesis and decomposition reactions

Explain the importance of water to the function of the body

Describe where water is found in the body

Explain the roles of oxygen and carbon dioxide in cell respiration

Explain pH and state normal pH ranges in body fluids

Explain how a buffer system resists major pH changes

Describe the functions and types of sugars, fats, and proteins

Explain how enzymes function as catalysts

Describe the function of DNA, RNA and ATP

Name the organic molecules that make up the cell membrane and state their functions

State the arrangement of the molecules in the cell membrane

State the five functions of proteins in the cell membrane

Describe the cytoplasm

Describe how the cell membrane regulates the composition of the cytoplasm

Explain isotonic, hypotonic, and hypertonic solutions and their effects on the cell

State the function of the nucleus and chromosomes

Describe the function of the cell organelles

Define each of these cellular transport mechanisms and give an example of the role of each in the body: diffusion, osmosis, facilitated diffusion, active transport, filtration, phagocytosis and pinocytosis

Describe what happens in mitosis and meiosis and describe the importance of each

Describe the four major categories of tissues and give general characteristics of each

Describe the function of epithelial tissue depending on their location

Describe the functions of connective tissue and relate them to the function of the body or an organ system

Explain the basic differences between smooth, skeletal and cardiac muscle

Describe in brief nervous tissue

Name the organs made of nerve tissue

Describe the location of pleural membranes, pericardial membranes, and the perineum-mesentery

State the location of mucous membranes and state the function of mucus

Name some membranes made of connective tissue

State the three functions of the integumentary system

Name the two layers of skin

State the location and function of the stratum corneum and the stratum germinativum

Describe the function of melanocytes and melanin

Describe the function of hair and nails

Describe the functions of the secretions of sebaceous glands, ceruminous glands and eccrine sweat glands

Describe how the arterioles in the dermis respond to heat, cold, and stress

Name the tissues that make up the subcutaneous tissue and describe their functions

Describe the function of the skeleton

Explain how bones are classified and give an example of each

Describe how the embryonic skeleton is replaced by bone

State the nutrients necessary for bone growth
Name the hormones involved in bone growth and maintenance
Explain what is meant by exercise for bones and explain its importance
Identify the two major subdivisions of the skeleton and list the bones in each area
Explain how joints are classified; give an example of each and describe the movements possible
Describe the parts of a synovial joint and explain their function
Describe muscle structure in terms of muscle cells, tendons and bones
Describe the difference between antagonistic and synergistic muscles
Name the energy sources for muscle contraction and state the simple equation for cell respiration
Explain the importance of hemoglobin and myoglobin and oxygen debt and lactic acid
Describe the neuromuscular junction and explain the function for each part
Describe the structure of a sarcomere
Explain polarization, depolarization and repolarization in terms of ions and charges
Describe the sliding filament theory of muscle contraction
State the major muscles of the body and their functions
Name the divisions of the nervous system and state the general functions of each
Name the parts of a neuron and the function of each
Explain the importance of Schwann cells in the peripheral nervous system and neuroglia in the central nervous system
Describe the electrical nerve impulse and impulse transmission at the synapse
Describe the types of neurons, nerves and nerve tracts
Explain the importance of stretch reflexes and flexor reflexes
Describe the reflex arc
State the functions of the parts of the brain and locate each part on a diagram
Name the meninges and describe their locations
State the locations and functions of cerebrospinal fluid
Explain the general purpose of sensations
Name the parts of the sensory pathway and the general functions of each part
Describe the characteristics of sensations
Name the cutaneous senses and explain their purpose
Explain referred pain and explain its importance
Explain the importance of proprioception, or muscle sense
Describe the pathways for the senses of smell and taste and explain how these senses are interrelated
Name the parts of the eye and explain their function in sight
Name the parts of the ear and explain their function in hearing
Describe the physiology of equilibrium
Distinguish between endocrine and exocrine glands
Define hormone and prostaglandin
Identify the primary endocrine glands and list the major hormones secreted by each
Explain the roles of positive and negative feedback mechanisms in hormone secretions
Describe the relationship between parathyroid hormone and calcitonin
Describe the relationship between insulin and glucagon
Explain what prostaglandins are made of and state some of their functions
Explain how protein hormones are believed to exert their effects
Explain how steroid hormones are believed to exert their effects
Describe the primary functions of blood
List the formed elements of blood and state the primary functions of each
Name the hemopoietic tissues and the kinds of blood cells each produces
Describe what happens to red blood cells at the end of their life span including the fate of hemoglobin
Explain the ABO and Rh blood types
Name the five kinds of white blood cells and the functions of each
State what platelets are and explain how they are involved in hemostasis
Describe the three stages of blood clotting
Explain how abnormal clotting is prevented in the vascular system
Describe the location of the heart in terms of body cavities and relationship to other structures
Name the chambers of the heart and the vessels that enter or leave each
State the valves of the heart and their function
State how heart sounds are created
Trace the pathway of a blood cell throughout the body

Describe coronary circulation

Describe the cardiac conduction pathway and its relationship to a normal electrocardiogram

Explain stroke volume, cardiac output and Starling's law of the heart

Explain how the nervous system regulates the function of the heart

Describe the structure and function of each of the blood vessels: arteries, veins and capillaries

Describe the exchange of gases that occur at the capillary level

Name the major systemic arteries and the parts of the body they nourish

Name the major systemic veins and the parts of the body they drain of blood

Define blood pressure and state the normal ranges for the systolic and diastolic indices

Describe the functions of the lymphatic system

State how lymph is formed

Describe the system of lymph vessels and explain how lymph is returned to the blood

State the location and function of lymph nodules and nodes

State the location and function of the spleen

Define immunity

Explain the role of the thymus in immunity

Explain the differences between humoral immunity and cell mediated immunity

Compare and contrast the development and function of B cells and T cells

Describe the differences between acquired immunity and genetic immunity

Explain how vaccines work

State the general function of the respiratory system

State the pathway of the respiratory system including nasal cavities, pharynx and larynx

State the function of the turbinates in the nasal cavity

Describe the structure and function of the larynx and the speaking mechanism

State the roles of the visceral and parietal pleura in respiration

State the changes in air pressure within the thoracic cavity during respiration

Explain the diffusion of gases in external and internal respiration

Describe how oxygen and carbon dioxide are transported in the blood

Explain the nervous and chemical mechanisms that regulate respiration

Explain how respiration affects the pH of certain body fluids

Describe the general function of the digestive system and name the major divisions

Identify the accessory organs of digestion

Explain the difference between mechanical and chemical digestion

Describe the structure and function of the teeth and tongue

Explain the function of saliva

Describe the location and function of the pharynx and esophagus

List and describe the four layers of the alimentary canal

Describe the difference in absorption between the large and small intestine

Describe the function of the normal flora in the colon

Define peristalsis

Define chyme

State the normal range of body temperature

Define metabolism, catabolism and anabolism

State the different ways heat is generated and lost in the body

State why the hypothalamus is the thermostat of the body

State what the products of cell respiration are and how the body disposes of them

Describe the metabolic roles of fats, glucose and proteins

Describe basal metabolic rate and the factors that affect it

Define kilocalories

Describe the water compartments and the name for the water in each

Explain how water moves between the compartments

Explain how water is taken in by the body and exits the body

Describe the location and general function of each organ in the urinary system

Name the parts of a nephron

Define glomerular filtration rate

Describe how the kidneys function in maintaining normal blood volume and pressure

Describe how the kidneys help to maintain normal blood pH and electrolyte balance

State the hormones that affect kidney function

Explain the interaction between capillary blood pressure and blood proteins

Describe the characteristics of normal urine
Define diploid and haploid
Describe the difference between spermatogenesis and oogenesis
Define gametes
Name the hormones necessary for the formation of gametes
List the essential and accessory organs of the male and female, give the general function of each
Identify and describe the structures that constitute external genitals in both sexes
Name the parts of a sperm cell
Define endometrium
Briefly describe the life cycle of an oocyte
Describe the menstrual cycle in terms of change in hormone levels and the condition of the endometrium
Beginning with fertilization, describe the major developmental changes during gestation
Describe the structure and function of the placenta and umbilical cord
Describe the difference between fetal circulation/respiration and adult circulation/respiration
State the length of an average gestation period
Describe the stages of labor
Describe the major changes that take place in an infant at birth
Explain how microorganisms are named and classified
Describe the distribution of and the benefits of normal flora
Explain what is meant by infectious disease
Describe the different methods by which infectious diseases are spread
List some important infectious diseases
Define genetic disease
Explain how genes can cause disease
Define homologous chromosomes, autosomes, sex chromosomes and genes
Define alleles, genotype, phenotype, homozygous, and heterozygous
Discuss the difference between dominant and recessive traits
List some important genetic diseases

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