

UNIT TERMINAL OBJECTIVE

- 1-2 At the completion of this unit, the EMT-Intermediate student will be understand basic anatomy and physiology and how it relates to the foundations of medicine.

COGNITIVE OBJECTIVES

At the completion of this unit, the EMT-Intermediate student will be able to:

- 1-2.1 Define anatomy, physiology, and pathophysiology. (C-1)
 - 1-2.2 Name the levels of organization of the body from simplest to most complex, and explain each. (C-1)
 - 1-2.3 Define homeostasis. (C-1)
 - 1-2.4 State the anatomical terms for the parts of the body. (C-1)
 - 1-2.5 Identify terminology to describe the location of body parts with respect to one another. (C-1)
 - 1-2.6 Review the body cavities and the major organs within each. (C-1)
 - 1-2.7 Identify the anatomical planes. (C-1)
 - 1-2.8 Identify areas of the abdomen and underlying organs. (C-1)
 - 1-2.9 Define each of the cellular transport mechanisms and give an example of the role of each in the body: diffusion, osmosis, facilitated diffusion, active transport.(C-1)
 - 1-2.10 Define metabolism, anabolism, catabolism. (C-1)
 - 1-2.11 Describe how glucose is converted to energy during cellular respiration. (C-1)
 - 1-2.12 Describe the general characteristics of each of the four major categories of tissues. (C-1)
 - 1-2.13 Name the three major layers of the skin. (C-1)
 - 1-2.14 Describe the functions of the skeleton. (C-1)
 - 1-2.15 Explain how bones are classified. (C-1)
 - 1-2.16 Explain how joints are classified. (C-1)
 - 1-2.17 Describe the structure and function of muscles. (C-1)
 - 1-2.18 List the three types of muscles. (C-1)
 - 1-2.19 State the functions of the nervous system. (C-1)
 - 1-2.20 Name the divisions of the nervous system. (C-1)
 - 1-2.21 Explain the structure of neurons. (C-1)
 - 1-2.22 Describe the types of nerves. (C-1)
 - 1-2.23 Describe the role of polarization, depolarization, repolarization in nerve impulse transmission. (C-1)
 - 1-2.24 Identify the components of the central nervous system. (C-1)
 - 1-2.25 State the function of the meninges and cerebrospinal fluid. (C-1)
 - 1-2.26 Identify the divisions of the autonomic nervous system and define their functions. (C-1)
 - 1-2.27 Discuss the regulator processes of hormonal secretion. (C-1)
 - 1-2.28 State the functions of hormones. (C-1)
 - 1-2.29 State the function of the hormones of the pancreas. (C-1)
 - 1-2.30 State the functions of epinephrine and norepinephrine and explain their relationship to the sympathetic division of the autonomic nervous system. (C-1)
 - 1-2.31 Describe the characteristics of blood and its composition. (C-1)
 - 1-2.32 Explain the function of red blood cells, white blood cells and platelets. (C-1)
 - 1-2.33 State the importance of blood clotting. (C-1)
 - 1-2.34 Describe the location of the heart. (C-1)
 - 1-2.35 Describe the function of the pericardium. (C-1)
 - 1-2.36 Identify the major vessels and chambers of the heart. (C-1)
 - 1-2.37 Identify the valves of the heart, and explain their functions. (C-1)
 - 1-2.38 Describe coronary circulation, and explain its purpose. (C-1)
 - 1-2.39 Describe the cardiac cycle. (C-1)
 - 1-2.40 Explain how heart sounds are created. (C-1)

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Preparatory: 1

Overview of Human Systems: 2

- 1-2.41 Name the parts of the cardiac conduction pathway. (C-1)
 - 1-2.42 Explain the relationship between stroke volume, heart rate, and cardiac output. (C-1)
 - 1-2.43 Explain how the nervous system regulates heart rate and force of contraction. (C-1)
 - 1-2.44 Describe the structure of arteries and veins, and relate their structure to function. (C-1)
 - 1-2.45 Describe the structure of capillaries, and explain the exchange processes that take place in capillaries. (C-1)
 - 1-2.46 Describe the pathway and purpose of pulmonary circulation. (C-1)
 - 1-2.47 Describe the pathway and purpose of systemic circulation. (C-1)
 - 1-2.48 Define blood pressure. (C-1)
 - 1-2.49 Explain the factors that maintain and regulate blood pressure. (C-1)
 - 1-2.50 Describe the functions of the lymphatic system. (C-1)
 - 1-2.51 Describe the immune response. (C-1)
 - 1-2.52 State the function of the respiratory system. (C-1)
 - 1-2.53 Describe the structure and functions of the components of the respiratory system. (C-1)
 - 1-2.54 Describe normal inhalation and exhalation. (C-1)
 - 1-2.55 Differentiate between ventilation and respiration. (C-1)
 - 1-2.56 Explain the diffusion of gases across the alveolar-capillary junction. (C-1)
 - 1-2.57 Describe how oxygen and carbon dioxide are transported in the blood. (C-1)
 - 1-2.58 Explain the nervous and chemical mechanisms that regulate respiration. (C-1)
 - 1-2.59 Describe the functions of the digestive system, and name its major divisions. (C-1)
 - 1-2.60 Describe the water compartments and the name for the fluid in each. (C-1)
 - 1-2.61 Explain how water moves between compartments. (C-1)
 - 1-2.62 Explain the regulation of the intake and output of water. (C-1)
 - 1-2.63 Describe the three buffer systems in body fluids. (C-1)
 - 1-2.64 Explain why the respiratory system has an effect on pH, and describe respiratory compensating mechanisms. (C-1)
 - 1-2.65 Explain the renal mechanisms for pH regulation of extracellular fluid. (C-1)
 - 1-2.66 Describe the effects of acidosis and alkalosis. (C-1)

AFFECTIVE OBJECTIVES

After the completion of this unit, the EMT-Intermediate student will be able to:

- 1-2.67 Appreciate how anatomy and physiology are the foundation of medicine. (A-2)

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

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DECLARATIVE

- I.
 - Introduction
 - A. Define
 - 1. Anatomy
 - 2. Physiology
 - 3. Pathophysiology
 - II.
 - Organization of the body
 - A. Cells
 - B. Tissues
 - C. Organs
 - D. Organ systems
 - 1. Integumentary system
 - 2. Skeletal system
 - 3. Muscular system
 - 4. Nervous system
 - 5. Respiratory system
 - 6. Circulatory system
 - 7. Lymphatic system
 - 8. Digestive system
 - 9. Excretory system
 - 10. Endocrine system
 - 11. Reproductive system
 - E. Homeostasis
 - F. Anatomical terminology
 - 1. Descriptive terms for body parts and areas
 - 2. Normal anatomical position
 - 3. Body cavities
 - a. Cranial cavity
 - b. Spinal cavity
 - c. Thoracic cavity
 - d. Abdominal cavity
 - e. Pelvic cavity
 - 4. Body planes
 - a. Frontal/ coronal plane
 - b. Sagittal plane
 - c. Transverse plane
 - 5. Abdominal quadrants
 - a. Right upper (RUQ)
 - (1) Liver
 - (2) Gallbladder
 - b. Left upper (LUQ)
 - (1) Liver
 - (2) Spleen
 - (3) Stomach
 - c. Right lower (RLQ)
 - (1) Intestines
 - d. Left lower (LLQ)

(1) Intestines

III. Cells

- A. Cellular transport mechanisms
 - 1. Diffusion
 - 2. Osmosis
 - 3. Facilitated diffusion
 - 4. Active transport

 - B. Cellular metabolism
 - 1. Anabolism
 - 2. Catabolism
 - 3. Cellular respiration

IV. Tissues

- A. Epithelial tissue and glands
 - B. Connective tissue
 - 1. Blood
 - 2. Adipose tissue
 - 3. Fibrous and elastic connective tissue
 - 4. Bone
 - 5. Cartilage
 - C. Muscle tissue
 - 1. Skeletal muscles
 - 2. Smooth muscles
 - 3. Cardiac muscles
 - D. Nerve tissue

V. Integumentary system

- A. Function of the skin
 - B. Skin layers
 - 1. The epidermis
 - 2. The dermis
 - 3. Subcutaneous tissue

VI. Skeletal system

- A. Functions of the skeleton
 - B. Classifications of bones
 - 1. Long bones
 - 2. Short bones
 - 3. Flat bones
 - 4. Irregular bones
 - C. The skeleton
 - 1. Axial
 - 2. Appendicular
 - D. Joints
 - 1. Immovable joints
 - 2. Slightly movable joints
 - 3. Freely movable joints

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VII. The muscular system

- A. Structure
 - B. Function
 - C. Types
 - 1. Skeletal
 - 2. Smooth
 - 3. Cardiac

VIII. The nervous system

- A. Function
 - 1. Voluntary activity
 - 2. Involuntary activity
 - B. Nervous system divisions
 - 1. Central nervous system
 - 2. Peripheral nervous system
 - C. Neurons
 - 1. Structure
 - a. Cell body
 - b. Dendrites
 - c. Axons
 - 2. Synapses
 - a. Neurotransmitter
 - b. Inactivators
 - 3. Types of neurons
 - a. Sensory neurons
 - b. Receptors
 - c. Motor neurons
 - D. Nerve types
 - 1. Sensory
 - 2. Motor
 - E. The nerve impulse
 - 1. Polarization
 - 2. Depolarization
 - 3. Repolarization
 - F. The central nervous system
 - 1. The spinal cord
 - 2. Brain
 - a. Ventricles
 - b. Medulla
 - c. Pons
 - d. Midbrain
 - e. Cerebellum
 - f. Hypothalamus
 - g. Thalamus
 - h. Cerebrum
 - i. Frontal lobes
 - j. Parietal lobes
 - k. Temporal lobes
 - l. Occipital lobes

3. Meninges and cerebral spinal fluid
 4. The autonomic nervous system
 - a. Sympathetic division
 - (1) Function
 - (2) Neuro transmitter
 - b. Parasympathetic division
 - (1) Function
 - (2) Neuro transmitter
 - c. Neuro receptors
 - (1) Alpha
 - (2) Beta

IX. The endocrine system

- A. Regulation of hormonal secretion
 - B. Function of hormones
 - C. Pancreatic hormones
 - 1. Insulin
 - 2. Glucagon
 - D. Adrenal hormones
 - 1. Epinephrine
 - 2. Norepinephrine

X. Blood

- A. Characteristics of blood
 - 1. Amount
 - 2. Color
 - 3. pH
 - 4. Viscosity
 - B. Plasma
 - C. Blood cells
 - 1. Red blood cells
 - a. Function
 - b. Production and maturation
 - c. Blood types
 - 2. White blood cells
 - a. Functions
 - 3. Platelet
 - a. Site of production
 - b. Function
 - 4. Blood clotting

XI. The heart

- A. Location
 - B. Pericardial membranes
 - 1. Parietal pericardium
 - 2. Visceral pericardium/ epicardium
 - 3. Serous fluid
 - C. Chambers, vessels, and valves
 - 1. Right atrium

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- a. Vena cavae
 - (1) Superior vena cava
 - (2) Inferior vena cava
 - b. Tricuspid valve
 - 2. Left atrium
 - a. Pulmonary veins
 - b. Mitral valves/ bicuspid
 - 3. Right ventricle
 - a. Pulmonary artery
 - b. Pulmonary semilunar valve
 - 4. Left ventricle
 - a. Aorta
 - b. Aortic semilunar valve
 - 5. Coronary vessels
 - D. The cardiac cycle
 - 1. Systole
 - 2. Diastole
 - E. Heart sounds
 - F. Cardiac conduction pathway
 - a. Sinoatrial node
 - b. Atrioventricular node
 - c. Bundle of His
 - d. Bundle branches
 - e. Purkinje fibers
 - G. Cardiac output
 - 1. Heart rate
 - a. Baroreceptor
 - b. Chemoreceptor
 - 2. Stroke volume
 - a. Starling's law of the heart
 - 3. Neural regulation of heart function
 - a. Parasympathetic
 - b. Sympathetic

XII. The vascular system

 - A. Arteries
 - B. Veins
 - 1. Valves
 - C. Capillaries
 - D. Exchange in the capillaries
 - 1. Gas exchange
 - 2. Fluid exchange
 - E. Pathways of circulation
 - 1. Pulmonary circulation
 - 2. Systemic circulation
 - F. Blood pressure
 - 1. Maintenance of systemic blood pressure
 - 2. Regulation of blood pressure

XIII. The lymphatic system and immunity

- A. Functions
 - B. Immunity
 - 1. Antigens and antibodies
 - 2. Antibody response

XIV. Respiratory system

- A. Function
 - B. Anatomy
 1. Nose and nasal cavities
 2. Pharynx
 3. Larynx
 4. Trachea and bronchial tree
 5. Lungs and pleural membranes
 6. Alveoli
 - C. The mechanics of breathing
 1. Inhalation
 2. Exhalation
 - D. Ventilation versus respiration
 - E. Exchange of gases
 1. Diffusion of gases
 - F. Transportation of gases in the blood
 - G. Regulation of respiration
 1. Nervous control
 2. Chemical control

XV. The digestive system

- A. Functions
 - B. Major divisions

XVI. Fluids and electrolytes

- A. Water compartments
 1. Intracellular
 2. Extracellular
 3. Interstitial
 4. Intravascular
 5. Extravascular
 - B. Fluid balance
 - C. Electrolytes
 1. Intake
 2. Output
 3. Regulation
 - D. Acid-base balance
 1. Respiratory compensation for metabolic changes
 2. Metabolic compensation
 - a. Buffer system
 - b. Renal system
 3. Effects of pH changes
 - a. Acidosis

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Preparatory: 1

Preparatory Overview of Human Systems: 2

- b. Alkalosis