



Medical Assistant – Anatomy and Physiology

EXAM INFORMATION

Items

74

Points

74

Prerequisites

NONE

Grade Level

12

Course Length

ONE YEAR

Career Cluster

HEALTH SCIENCE

NCHSE HEALTH SCIENCE BUNDLE

Performance Standards

NOT INCLUDED

Certificate Available

YES

DESCRIPTION

An instructional program that prepares individuals to support physicians by providing assistance during patient examinations, treatment administration and monitoring; by keeping patient and related health record information; and by performing clinical, administrative and laboratory duties.

EXAM BLUEPRINT

STANDARD**PERCENTAGE OF EXAM**

1- Body Cavities & Quadrants	3%
2- Cells & Tissues	3%
3- Integumentary System	7%
4- Skeletal System	15%
5- Muscular System	5%
6- Cardiovascular System	14%
7- Lymphatic/Immune System	4%
8- Respiratory System	11%
9- Digestive System	8%
10- Nervous System	9%
11- Endocrine System	9%
12- Urinary System	4%
13- Reproductive System	8%



STANDARD 1

STUDENTS WILL IDENTIFY THE BODY CAVITIES AND QUADRANTS AND THE ORGANS THEY CONTAIN

- Objective 1** Locate the body cavities and the organs contained therein.
1. Cranial: Brain
 2. Spinal or Vertebral: Spinal cord
 3. Thoracic: Heart and lungs
 4. Abdominal: Liver, most of the intestines, stomach, gallbladder, spleen, kidneys
 5. Pelvic: Urinary bladder, internal reproductive organ
- Objective 2** Identify the four major abdominal quadrants and the organs in each quadrant.
1. Right upper quadrant (RUQ): Liver, gallbladder, right kidney
 2. Left upper quadrant (LUQ): Stomach, spleen, pancreas, left kidney
 3. Right lower quadrant (RLQ): Appendix, right ovary
 4. Left lower quadrant (LLQ): Left ovary

STANDARD 2

STUDENTS WILL IDENTIFY THE STRUCTURES AND FUNCTIONS OF THE CELL AND TISSUES

- Objective 1** Compare and contrast mitosis and meiosis.
1. Describe the purpose of mitosis and meiosis.
 2. Identify the outcome of chromosomes for each.
 3. Identify the outcome of numbers of cells for each.
- Objective 2** Differentiate between cellular transport mechanisms.
1. Describe diffusion.
 2. Describe osmosis.
 3. Describe filtration.
- Objective 3** Identify the six levels of body organization.
1. Describe the chemical level.
 2. Describe the cellular level.
 3. Describe the tissues.
 4. Describe the organs.
 5. Describe organ systems.
 6. Describe the organism.
- Objective 4** Distinguish between the four basic tissue types.
1. Contrast the functions of the four tissue types.
 - a. Epithelial—coverings and linings
 - b. Connective—support and structure
 - c. Muscular—movement
 - d. Nervous—nerves, brain, spinal cord



STANDARD 3

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE INTEGUMENTARY SYSTEM

Objective 1 Identify the layers of the skin.

1. Epidermis
2. Dermis
3. Subcutaneous

Objective 2 Identify the appendages.

1. Nails
2. Sweat (sudoriferous) glands
3. Oil (sebaceous) glands
4. Hair

Objective 3 Describe the functions of the integumentary system.

1. Protection against water loss
2. Protection against infection
3. Vitamin D production
4. Sensory organ
5. Absorption of medications
6. Excretion of water, salts, and waste
7. Temperature regulation
8. Protection against UV light

Objective 4 Identify the signs and symptoms of disorders of the integumentary system.

1. Athlete's foot
2. Hives
3. Herpes
4. Melanoma
5. Decubitus ulcers
6. Warts
7. Pediculosis
8. Rash
9. Ringworm

Objective 5 Describe the signs and symptoms of infection and inflammation.

1. Recognize redness, swelling, heat, and pain.
2. Identify how the inflammation process is initiated.
3. Describe the effects of histamine in inflammation



STANDARD 4

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE SKELETAL SYSTEM

- Objective 1** Identify the functions of the skeletal system.
1. Hematopoiesis
 2. Structure
 3. Support
 4. Muscle attachment and movement
 5. Mineral storage
- Objective 2** Identify the basic bones of the skeleton.
1. Cranium (frontal, parietal, occipital, temporal, maxillae, mandible)
 2. Vertebrae (cervical, thoracic, lumbar, sacral, coccyx)
 3. Rib cage (ribs, sternum, xiphoid process)
 4. Arm (humerus, radius, ulna, carpals, metacarpals, phalanges)
 5. Pelvis (ilium, ischium, pubis)
 6. Leg (femur, tibia, fibula, tarsals, metatarsals, phalanges)
- Objective 3** Distinguish between the following structures:
1. Simple (closed)
 2. Compound (open)
 3. Greenstick
 4. Impacted (compression)
 5. Comminuted
 6. Spiral
 7. Colles
- Objective 4** Identify the signs and symptoms of disorders of the skeletal system.
1. Arthritis (osteoarthritis, rheumatoid arthritis, gouty arthritis)
 2. Osteoporosis
 3. Scoliosis, Lordosis, Kyphosis
 4. Carpal tunnel syndrome
 5. Bursitis
 6. Sprain

STANDARD 5

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE MUSCULAR SYSTEM

- Objective 1** Identify the functions of the muscular system.
1. Heat production
 2. Movement
 3. Structure
 4. Protection
- Objective 2** Differentiate between the three types of muscle tissue.
1. Locate cardiac muscles and describe their characteristics (striated, involuntary, and found in the heart).



2. Located smooth muscles and describe their characteristics (non-striated, involuntary, and found in the hollow organs like the stomach).
3. Locate skeletal muscles and describe their characteristics (striated, voluntary, found on the bones, etc).

Objective 3 Contrast the differences between tendons and ligaments.

1. Tendons—connect muscles to bones
2. Ligaments—connect bone to bone

Objective 4 Identify the basic muscles of the human body.

1. Deltoid
2. Gluteus (maximus, medius)
3. Rectus femoris
4. Vastus lateralis
5. Diaphragm

Objective 5 Identify the signs and disorders of the muscular system.

1. Strains
2. Atrophy
3. Tendonitis
4. Fibromyalgia

STANDARD 6

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE CARDIOVASCULAR SYSTEM

Objective 1 Identify the components of the cardiovascular system.

1. Blood
2. Heart
3. Blood vessels

Objective 2 Identify the functions of the cardiovascular system.

1. Transportation of nutrients and wastes
2. Transportation of heat
3. Transportation of oxygen and carbon dioxide
4. Transportation of hormones, antibodies, and enzyme

Objective 3 Identify the structures of the heart.

1. Aorta
2. Coronary arteries
3. Septum
4. Myocardium
5. Inferior and superior vena cavae
6. Right and left atrium
7. Tricuspid valve, Bicuspid valve (mitral valve)
8. Right and left ventricle
9. Pulmonary semilunar valve, aortic semilunar valve
10. Pulmonary arteries, pulmonary veins

Objective 4 Locate the major arteries and veins of the cardiovascular system.

1. Identify appropriate arteries for taking an accurate blood pressure and pulse.
 1. Apical
 2. Carotid



3. Radial
 4. Brachial
 5. Femoral
2. Identify appropriate veins for venipunctures.
1. Median cubital
 2. Basilic
 3. Cephalic

Objective 5 Describe the layers of and functions of blood vessels.

1. Arteries
 1. Takes blood from the heart
 2. Thicker to withstand the pressure from the heart
2. Veins
 1. Takes blood toward the heart
 2. Modified with valves to prevent backflow of blood
3. Capillaries
 1. Gas and nutrient exchange between the blood and body cells

Objective 6 Identify the signs and symptoms of disorders of the cardiovascular system.

1. Myocardial infarction
2. Cerebrovascular accident (CVA—stroke)
3. Hypertension
4. Embolus/Thrombus
5. Arteriosclerosis, Atherosclerosis
6. Cardiac arrest
7. Phlebitis
8. Arrhythmia
9. Congestive heart failure
10. Aneurysm

STANDARD 7

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE LYMPHATIC/IMMUNE SYSTEM

Objective 1 List the functions of the lymphatic system.

1. Transport excess tissue fluid to the blood vessels
2. Immunity

Objective 2 Describe the functions of the major structures of the immune system.

1. Tonsils
 1. Lymphatic tissue in the pharynx
 2. Helps to remove pathogens from food and air
2. Lymph nodes
 1. Masses of lymphatic tissue
 2. Filters pathogens from lymph

Objective 3 Describe the human body's lines of defense against disease.

1. Discuss the physical and chemical barriers.
 1. Mucous membranes (traps pathogens)
 2. Cilia (propel pathogens out of respiratory tract)
 3. Coughing and sneezing



4. Hydrochloric acid (stomach)
5. Tears in the eyes (contain bactericidal chemicals)
2. Discuss non-specific immunity.
 1. Fever
 2. Inflammation (WBCs destroy pathogens)
3. Discuss specific immunity.
 1. Immune response
 2. Production of antibodies
4. Differentiate between active and passive immunity.
 1. Vaccination
 2. Delivery of antibodies
 3. Through the mother
 4. Through an injection (gamma globulin)

- Objective 4** Identify the signs and symptoms of disorders of the lymphatic and immune systems.
1. Influenza
 2. H1N1
 3. HIV/AIDS
 4. Mononucleosis
 5. Autoimmune disorder

STANDARD 8

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE RESPIRATORY SYSTEM

- Objective 1** List the functions of the lymphatic system.

1. Nose and nasal cavity
2. Pharynx
3. Epiglottis
4. Larynx
5. Trachea
6. Bronchi
7. Bronchioles
8. Lungs
9. Alveoli

- Objective 2** Describe the functions of the respiratory system.

1. Warm, moisten, and air filter
2. Sound production
3. Carbon dioxide-oxygen gas exchange

- Objective 3** Identify the signs and symptoms of disorders of the respiratory system.

1. Asthma
2. Tuberculosis (TB)
3. Upper respiratory infection (URI)
4. Pneumonia
5. Respiratory Syncytial Virus (RSV)
6. Chronic obstructive pulmonary disease (COPD)
7. Bronchitis
8. Epistaxis (Bloody nose)



- Objective 4** Identify the signs and symptoms of respiratory distress.
1. Dyspnea (pursed lip breathing)
 2. Tachypnea
 3. Wheezing

STANDARD 9

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE DIGESTIVE SYSTEM

- Objective 1** Describe the functions of the digestive system.

1. Ingestion
2. Digestion
3. Absorption
4. Excretion

- Objective 2** Identify the structures of the alimentary canal organs and their basic functions.

1. Mouth—chemical and mechanical digestion
2. Pharynx—passageway
3. Esophagus—passageway to the stomach
4. Stomach—chemical and mechanical digestion
5. Small intestine—nutrient absorption
6. Large intestine—absorption of water, collect residue for excretion

- Objective 3** Identify the structures of the accessory organs and their basic functions.

1. Salivary glands—produce saliva to break down food
2. Pancreas—releases digestive enzymes into the small intestine
3. Liver—produces bile to break down fats
4. Gallbladder—storage of bile

- Objective 4** Identify the signs and symptoms of disorders of the digestive system.

1. Irritable bowel syndrome (IBS)
2. Diverticulitis
3. Hemorrhoids
4. Celiac disease
5. Appendicitis
6. Ulcers
7. Hernia
8. Colon cancer

STANDARD 10

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE NERVOUS SYSTEM

- Objective 1** Describe the general functions of the nervous system.

1. Detects and interprets sensory information.
2. Voluntary and involuntary integration of the stimulus
3. Response to stimulus (movement or secretion)

- Objective 2** Differentiate between the central nervous system (CNS) and peripheral nervous system.

1. CNS
 - I. Brain



2. Spinal cord
2. PNS
 3. Peripheral nerves
 4. Sympathetic division
 5. Parasympathetic division
3. Response to stimulus (movement or secretion)

Objective 3 Identify the structures of the nervous system and their major functions.

1. Brain
 1. Cerebrum
 1. Frontal lobe—personality, reason, and speech
 2. Parietal lobe—taste and skin sensations
 3. Occipital lobe—sight
 4. Temporal lobe—hearing and memory
 2. Cerebellum—balance and coordination
 3. Midbrain—relay station for impulses
 4. Brain stem—heart rate and respirations
 1. Medulla
 2. Pons
 5. Hypothalamus—control of endocrine functions, blood pressure, and temperature regulation
 6. Pituitary gland—secretes many hormones
3. Spinal cord—reflex center, conduction of nerve impulses
2. 3. Cerebrospinal fluid (CSF)—shock absorption and provides nutrients to CNS.
4. Meninges (dura mater, arachnoid mater, pia mater)—protection of CNS.
5. Neurons (sensory, motor, and interneuron)—nerves

Objective 4 Identify the signs and symptoms of disorders of the nervous system.

1. Alzheimer's disease
2. Meningitis
3. Headaches
4. Epilepsy
5. Paralysis (hemiplegia, paraplegia, quadriplegia)
6. Herpes zoster
7. Multiple sclerosis
8. Sciatica

STANDARD 11

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE ENDOCRINE SYSTEM

Objective 1 Describe the general functions of the endocrine system.

1. Regulates growth, development, and maturation.
2. Regulates chemical balance by the production of hormones

Objective 2 Describe what a hormone is and how it works.

1. Chemical secreted into the blood to have an effect on the target tissue
2. Produced by endocrine glands



- Objective 3** Describe the major locations, secretions (hormones), and functions of the following glands:
1. Pituitary—growth hormone, ACTH, TSH, oxytocin
 2. Thyroid—thyroxin
 3. Pancreas—insulin
 4. Adrenal—cortisol, adrenaline
 5. Ovaries—estrogen, progesterone
 6. Testes—testosterone
- Objective 4** Identify the signs and symptoms of disorders of the endocrine system.
1. Diabetes mellitus (Types 1 and 2)
 2. Hypothyroidism/hyperthyroidism
 3. Dwarfism/gigantism

STANDARD 12

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE URINARY SYSTEM

- Objective 1** Describe the functions of the urinary system.
1. Excrete waste and water from the body
 2. Regulate fluid balance and blood composition
- Objective 2** Identify the structures of the urinary system and their major functions.
1. Kidneys—filter the blood and form urine
 2. Ureters—passageway for urine from the kidneys to the bladder
 3. Bladder—temporary storage of urine
 4. Urethra—passageway of urine to the outside of the body
- Objective 3** Identify the signs and symptoms of disorders of the urinary system.
1. Kidney stones
 2. Cystitis
 3. Pyelonephritis
 4. Incontinence
 5. Renal failure

STANDARD 13

STUDENTS WILL DESCRIBE THE ANATOMY AND PHYSIOLOGY OF THE REPRODUCTIVE SYSTEM

- Objective 1** Describe the functions of the reproductive system.
1. Production of gametes (egg and sperm) by the gonads
 2. Produce hormones to help in the maturation process
- Objective 2** Identify the structures of the female reproductive system and their major functions.
1. Breasts—lactation
 2. Ovaries—production of eggs, estrogen, and progesterone
 3. Uterine tubes—site of fertilization, passage between the ovaries and uterus
 4. Uterus—nourishment and protection of the fetus
 1. Cervix
 2. Endometrium
 5. Vagina—birth canal, exit for menstrual flow



- Objective 3** Identify the structures of the male reproductive system and their major functions.
1. Penis—protects the urethra
 2. Testes—production of testosterone and sperm
 3. Scrotum—muscular sac containing the testicles
 4. Epididymis—storage and maturation of sperm
 5. Vas deferens—passageway of semen from the testicles connecting with the urethra
 6. Prostate gland—secretes fluids for sperm motility
 7. Urethra—passageway for urine and semen

- Objective 4** Identify the signs and symptoms of disorders of the reproductive system.
1. Female
 1. Ovarian cyst
 2. Premenstrual syndrome (PMS)
 3. Menopause
 4. Cancer
 1. Cervical cancer
 2. Ovarian cancer
 3. Breast cancer
 5. Endometriosis
 6. Human Papillomavirus (HPV)
 7. Pelvic Inflammatory Disease (PID)
 2. Male
 1. Cancer
 1. Prostate cancer
 2. Testicular cancer
 2. Epididymitis
 3. Prostatitis
 4. Benign Prostatic Hypertrophy (BPH)

- Objective 5** Review the following self-examinations:
1. Breast self-examine (BSE)
 2. Testicular self-exam (TSE)