Medical Anatomy and Physiology

Exam Information

Exam number
702

Items
73

Points
102

Prerequisites
None

Recommended course length
One year

National Career Cluster
Health Science

NCHSE Health Science Bundle

Performance standards
Included (Optional)

Certificate available
Yes

Description

The Medical Anatomy and Physiology industry certification exam assesses learners' in-depth knowledge of healthcare careers through actual clinical experience in a variety of areas. The exam covers intermediate anatomy & physiology, medical terminology, diseases and disorders, and medical ethics. Learners demonstrate their preparedness for the Advanced Medical Anatomy and Physiology course and/or for a variety of health science programs.

Exam Blueprint

Standard	Percentage of exam
1. Body plan & organization	6%
2. Basic principles of body chemistry	4%
3. Cells	5%
4. Histology & integumentary system	8%
5. Skeletal system	9%
6. Muscular system	9%
7. Nervous system & special senses	13%
8. Endocrine system	5%
9. Blood	7%
10. Lymphatic system	3%
11. Cardiovascular system	3%
12. Respiratory system	7%
13. Digestive system	7%
14. Urinary system	8%
15. Reproductive system	8%

Standard 1

Students will explore and describe the body plan, organization, and homeostasis.

Objective 1 Contrast the sciences of anatomy and physiology.

Objective 2 Describe the six levels of structural organization of the human body and their interrelationship.

1. Chemical
2. Cellular
3. Tissue
4. Organ
5. System
6. Organism

Objective 3 Describe the following:

1. Metabolism
    a. Anabolic process
    b. Catabolic process

Objective 4 Identify commonly used planes to divide the body based upon anatomical position.

1. Sagittal
2. Midsagittal
3. Transverse (horizontal)
4. Frontal (coronal)

Objective 5 Apply directional terms used in human anatomy.

1. Posterior/Anterior
2. Medial/Lateral
3. Proximal/Distal
4. Superficial/Deep
5. Superior/Inferior

Objective 6 Identify the body cavities and locate the following organs within each cavity.

1. Dorsal Cavity
    a. Vertebral (spinal) -spinal cord
    b. Cranial-brain
2. Ventral Cavity
    a. Thoracic
        i. Mediastinum-heart, bronchi, esophagus, thymus
        ii. Pericardial-heart
        iii. Pleural-lungs
3. Abdominopelvic Cavity-liver, spleen, intestines, kidneys, stomach
    a. Abdominal-liver, spleen, intestines, kidneys, stomach
    b. Pelvic-intestines, urinary bladder, sex organs

Objective 7 Identify the major organ(s) in each abdominal quadrant.

1. RUQ-right upper quadrant-liver, gallbladder, right kidney
2. RLQ-right lower quadrant-cecum, appendix, right ovary

3. LUQ-left upper quadrant-spleen, stomach, left kidney
4. LLQ-lower left quadrant-left ovary

Objective 8 Examine the effects of stress on homeostasis.

Objective 9 Differentiate between negative and positive feedback mechanisms to maintain homeostasis. Give examples of each.

1. Positive feedback examples: childbirth, breast feeding, blood clotting, etc.
2. Negative feedback examples: blood pressure, blood glucose, thermoregulation, etc.

Standard 1 Performance Evaluation included below (Optional)

Standard 2

Students will explain basic principles of body chemistry.

Objective 1 Review the following terms and concepts.

1. States of Matter
2. Elements
3. Basic components of the atom
    a. Nucleus
    b. Electrons
    c. Protons
    d. Neutrons

Objective 2 Identify the four major elements in the body.

1. Carbon
2. Hydrogen
3. Oxygen
4. Nitrogen

Objective 3 Differentiate between:

1. Compound
2. Molecule

Objective 4 Describe the characteristics of bonds. (Do not place emphasis on which is the strongest type.)

1. Ionic
2. Covalent
3. Hydrogen

Objective 5 Analyze ions in a solution (electrolytes) and differentiate between:

1. Cation
2. Anion

Objective 6 Describe the properties of water and how it is utilized in the human body.

1. Universal solvent
2. Transport
3. Lubricant
4. Heat capacity
5. Chemical reactions

Objective 7 Distinguish between:

1. Inorganic compounds-do not contain carbon, small molecules, usually form ionic bonds
2. Organic compounds-usually contain carbon, large molecules, form covalent bonds, flammable

Objective 8 Describe the structures and functions of the following organic compounds and give an example of each:

1. Carbohydrates
2. Proteins (amino acids)
3. Lipids
4. Nucleic acids (RNA, DNA)

Objective 9 Define pH and identify the different solutions based on the pH scale.

1. Acidic
2. Basic (alkaline)
3. Neutral
4. Blood ph = 7.35 to 7.45

Objective 10 Describe how the body produces energy during cellular respiration

1. ATP ↔ ADP + P + ENERGY

Standard 3

Students will describe basic structures and functions of cells.

Objective 1 Identify the principal parts of a generalized animal cell and their functions.

1. Nucleus
    a. Nucleolus
    b. Chromosome
    c. Chromatin
        d. Gene (DNA, RNA)
2. Cytoplasm
    a. Cytosol
    b. Organelles
        i. Ribosome
        ii. Endoplasmic Reticulum (smooth, rough)
        iii. Golgi complex (body)
        iv. Lysosome
        v. Mitochondria
        vi. Centrosome (centrioles)
3. Cell membrane
    a. Microvilli (absorption)

b. Cilia (transports products along the surface of the cell, “crowd surfers”)
c. Flagella (transports the cell)

Objective 2 Describe a selectively permeable membrane and factors which influence permeability.

Objective 3 Contrast intracellular and extracellular fluid in terms of location and composition.

Objective 4 Describe each of the following cellular transport processes and classify them as active or passive.

1. Passive processes
   a. Simple diffusion
   b. Facilitated diffusion
   c. Filtration (dialysis)
   d. Osmosis
2. Active processes
   a. Endocytosis (phagocytosis)
   b. Exocytosis
   c. Active transport (Sodium/Potassium pump)

Objective 5 Compare and contrast the osmotic effects that occur when a cell is placed in the following solutions:

1. Isotonic
2. Hypotonic
3. Hypertonic

Objective 6 Compare and Contrast

1. Mitosis
2. Meiosis

Standard 4

Students will describe basic structures and functions of histology, and the integumentary system.

Objective 1 Identify and describe the general characteristics and functions of each of the four principle types of tissues.

1. Epithelial-strategies for tissue identification (arrangement & cell shape)
2. Connective-adipose, cartilage, dense fibrous, blood, bone
3. Muscular-skeletal, smooth, cardiac
4. Nervous – neurons, neuroglial cells

Objective 2 Differentiate between the four basic types of membranes.

1. Mucous
2. Serous
3. Synovial

4. Cutaneous

Objective 3 Identify and describe the structures and functions of the integumentary system components.

1. Skin
2. Glands
3. Hair
4. Nails

Objective 4 Identify the major layers of skin.

1. Epidermis
2. Dermis
3. Subcutaneous (hypodermis)

Objective 5 Contrast the following:

1. Exocrine glands (sudoriferous, sebaceous)
2. Endocrine glands (hormones)

Objective 6 Explain the following diseases and disorders of the integumentary system.

1. Skin cancers
    a. Basal cell carcinoma
    b. Squamous cell carcinoma
    c. Malignant melanoma
2. Decubitus ulcers
3. Eczema
4. Acne
5. Lesion
6. Burns
    a. 1st degree
    b. 2nd degree
    c. 3rd degree

Standard 4 Performance Evaluation included below (Optional)

Standard 5

Students will describe the structures and functions of the skeletal system and its components.

Objective 1 Identify the general functions of the skeletal system

Objective 2 Identify the roles of the following in bone growth and ossification:

1. Osteoblasts
2. Osteocytes
3. Osteoclasts

Objective 3 Students will describe the structures and functions of the skeletal system

and its components.

1. Short
2. Flat
3. Irregular
4. Long

Objective 4 Describe the features of a long bone.

1. Periosteum
2. Diaphysis
3. Epiphysis
4. Medullary cavity
5. Red marrow
6. Yellow marrow
7. Articular cartilage
8. Endosteum
9. Compact bone
10. Spongy bone

Objective 5 Describe and locate the following bone markings.

1. Foramen
2. Meatus
3. Sinus
4. Fossa
5. Condyle
6. Tuberosity
7. Trochanter
8. Tubercle
9. Process

Objective 6 Describe and differentiate between the following terms:

1. Suture
2. Fontanel

Objective 7 Locate the following bones of the axial and appendicular skeletons.

1. Axial Skeleton
    a. Mandible
    b. Maxilla
    c. Zygomatic
    d. Frontal
    e. Parietal
    f. Occipital
    g. Sphenoid
    h. Ethmoid
    i. Hyoid
    j. Temporal
    k. Vertebrae

    l. Ribs
    m. Sternum
2. Appendicular Skeleton
    a. Clavicle
    b. Scapula
    c. Pubic bone
        i. Ilium
        ii. Ischium
        iii. Pubis
    d. Femur
    e. Patella
    f. Tibia
    g. Fibula
    h. Tarsals
    i. Metatarsals
    j. Phalanges
    k. Humerus
    l. Ulna
    m. Radius
    n. Carpals
    o. Metacarpals

Objective 8 Contrast the average number, location, and function of each of the five groups of vertebrae.

1. Cervical
2. Thoracic
3. Lumbar
4. Sacral
5. Coccygeal

Objective 9 Explain the structural and functional classifications of articulations.

1. Structural:
    a. Fibrous
    b. Cartilaginous
    c. Synovial
2. Functional:
    a. Synarthrotic
    b. Amphiarthrotic
    c. Diarthrotic

Objective 10 Differentiate between ligaments and tendons.

Objective 11 Identify the following diseases and disorders of the skeletal system.

1. Herniated disk
2. Osteoarthritis
3. Osteoporosis
4. Scoliosis
5. Kyphosis
6. Lordosis

7. Spina bifida
8. Rheumatoid arthritis (RA)

Standard 6

Students will describe the structures and functions of the muscular system and its components.

Objective 1 Describe the general functions of the muscular system.

Objective 2 Describe the four characteristics of muscle tissue.

1. Elasticity
2. Excitability (irritability)
3. Extensibility
4. Contractility

Objective 3 Contrast the general location, microscopic appearance, control, and functions of the three specific types of muscle tissue.

1. Skeletal
2. Smooth
3. Cardiac

Objective 4 Identify the structures of the sarcomere.

1. Actin (thin filament)
2. Myosin (thick filament)

Objective 5 Describe what occurs at the neuromuscular junction.

1. Nerve impulse (action potential)
2. Ach release (neurotransmitter)
3. Muscle contraction stimulated

Objective 6 Describe the sliding-filament model of muscle contraction.

Objective 7 Define the following terms:

1. Origin
2. Insertion

Objective 8 Review terms of movement:

1. Flexion/extension
2. Abduction/adduction
3. Plantar flexion/dorsiflexion
4. Rotation

Objective 9 Explain the role of the following:

1. Prime movers (agonists)

2. Antagonists
3. Synergist
4. Fixators

Objective 10 Describe the locations and functions of the following skeletal muscles:

1. Masseter
2. Sternocleidomastoid
3. Trapezius
4. Biceps brachii
5. Triceps brachii
6. Deltoid
7. Diaphragm
8. Pectoralis major
9. Latissimus dorsi
10. Rectus abdominis
11. External oblique
12. Gastrocnemius
13. Tibialis anterior
14. Soleus
15. Hamstrings
    a. Semimembranosus
    b. Semitendinosus
    c. Biceps femoris
16. Quadriceps
    a. Rectus femoris
    b. Vastus lateralis
    c. Vastus medialis
    d. Vastus intermedius
17. Gluteus maximus
18. Sartorius

Objective 11 Identify the following diseases and disorders of the muscular system.

1. Fibromyalgia
2. Muscular dystrophy
3. Medial tibial stress syndrome
4. Compare and contrast the following, describe the three degrees of injury:
    a. Sprain
    b. Strain

Standard 7

Students will describe the structures and functions of the nervous system and special senses.

Objective 1 Describe the three broad functions of the nervous system.

1. Sensory
2. Integration
3. Motor

Objective 2 Describe the general organization of the nervous system.

1. Central Nervous System (CNS)
    a. Brain
    b. Spinal Cord
2. Peripheral Nervous System (PNS)
    a. Spinal nerves 1. 31 pairs
    b. Cranial nerves 1. I-XII
    c. Subdivisions
        i. Autonomic Division
            1. Sympathetic
            2. Parasympathetic
        ii. Somatic Division

Objective 3 List the functions and structures of neurons and neuroglial cells.

1. Neuron
2. Astrocytes
3. Microglia
4. Oligodendrocytes
5. Ependymal cells
6. Schwann cells
7. Satellite cells

Objective 4 Contrast white and gray matter of nervous tissue.

Objective 5 Identify the structures responsible for the maintenance and protection of the central nervous system.

1. Meninges
    a. Dura mater
    b. Arachnoid mater
    c. Pia mater

Objective 6 Describe the location and function of CSF.

1. Ventricles
2. Subarachnoid space

Objective 7 Identify the four principal parts of the brain.

1. Cerebrum
    a. Frontal
    b. Parietal
    c. Temporal
    d. Occipital
2. Cerebellum
3. Brain stem
    a. Medulla oblongata

b. Pons
c. Midbrain

4. Diencephalon
   a. Thalamus
   b. Hypothalamus

Objective 8 Sequence the major events when the nerve impulse (action potential) is initiated and transmitted through a neuron. (All or None Principle)

Objective 9 Explain the role of each of the components of a reflex arc.

1. Reflex
2. Reflex arc
3. Receptor
4. Sensory neuron
5. Association (interneuron) neuron
6. Motor neuron
7. Effector

Objective 10 Explain the following diseases and disorders of the nervous system.

1. Amyotrophic Lateral Sclerosis (ALS)
2. Alzheimer's Disease
3. Bacterial meningitis
4. Cerebral palsy
5. Epilepsy
6. Multiple Sclerosis
7. Guillain-Barre syndrome
8. Parkinson's Disease
9. Cerebrovascular Accident (CVA)-stroke

Objective 11 Identify the principal anatomical structures of the eye.

1. Accessory structures
   a. Eyelid
   b. Conjunctiva
   c. Lacrimal apparatus
   d. Extrinsic muscles
2. Layers of the eyeball
   a. Fibrous tunic
      i. Sclera
      ii. Cornea
   b. Vascular tunic
      i. Choroid
      ii. Ciliary body
      iii. Iris
      iv. Lens
      v. Pupil
3. Nervous tunic
   a. Retina

Objective 12 Identify the principal anatomical structures of the ear.

1. Outer ear
    a. Auricle
    b. Auditory Canal
2. Middle ear
    a. Tympanic cavity
    b. Tympanic membrane
    c. Auditory (Eustachian) tube
    d. Auditory ossicles
    e. Malleus
    f. Incus
    g. Stapes
3. Inner ear
    a. Semicircular canals
        i. Vestibule
        ii. Cochlea & Organ of Corti

Objective 13 Identify and describe the principle anatomical structures and functions associated with a sense of taste and smell.

1. Gustatory cells (taste buds)
2. Olfactory bulb

Objective 14 Explain the following diseases and disorders associated with special senses.

1. Ametropia-abnormal refracted light
    a. Myopia
    b. Hyperopia
    c. Presbyopia
2. Cataracts
3. Conjunctivitis
4. Strabismus
5. Glaucoma
6. Macular degeneration
7. Vertigo
8. Tinnitus
9. Middle ear infection (Otitis Media)
10. Deafness
    a. Conductive
    b. Sensorineural

Standard 8

Students will describe the structures and functions associated with the endocrine system.

Objective 1 Identify the general functions of the endocrine system.

Objective 2 Describe a “hormone” and how it functions in the body.

Objective 3 Describe the location, secretion, and functions of the major endocrine glands.

1. Hypothalamus
    a. Antidiuretic Hormone (ADH)
        i. Produced in hypothalamus
        ii. Stored in posterior pituitary
2. Oxytocin Hormone (OT)
    a. Produced in hypothalamus
    b. Stored in posterior pituitary
3. Pituitary Gland-found in the hypophyseal fossa “Sella Turcica”
4. Anterior Pituitary (adenohypophysis)
    a. Human Growth Hormone (HGH)
        i. Targets cells stimulating growth
    b. Thyroid Stimulating Hormone (TSH)
        i. Targets thyroid gland
    c. Adrenocorticotropic Hormone (ACTH)
        i. Targets adrenal cortex
5. Posterior Pituitary (neurohypophysis)
    a. Antidiuretic Hormone (ADH); also known as vasopressin
        i. Neural stimulus releases ADH to target kidneys for water retention
    b. Oxytocin Hormone (OT)
        i. Neural stimulus releases (OT)to target uterus for child birthing
        ii. Neural stimulus releases (OT)to target breast tissue for milk let down
6. Thyroid Gland-found inferior to the larynx
    a. Thyroxine (T4)
        i. Targets cells increasing metabolism
    b. Triiodothyronine (T3)
        i. Targets cells increasing metabolism
7. Adrenal Gland-found atop the kidneys
    a. Adrenal Cortex
        i. Adrenocorticotropic Hormone (ACTH)
            1. Stimulates the release of cortisol
    b. Cortisol
        i. Coping with long term stress
        ii. Anti-inflammatory by suppressing white blood cells
    c. Adrenal Medulla-sympathetic stimulus for sustained “Fight or Flight”
        i. Epinephrine- (adrenaline) - increasing cell metabolism
        ii. Norepinephrine- (noradrenaline) - increasing cell metabolism
8. Pancreas Gland-Exocrine/Endocrine gland in LUQ posterior to the stomach
    a. Insulin
        i. Released from beta cells to target cells to decrease blood sugar
    b. Glucagon
        i. Released from alpha cells to break down glycogen to increase blood sugar

Objective 4 Explain the following diseases and disorders of the endocrine system.

1. Dwarfism
2. Gigantism
3. Acromegaly
4. Hypothyroidism
    a. Myxedema
    b. Cretinism-congenital hypothyroidism
5. Hyperthyroidism (Graves’ disease)

a. Goiter
b. Exophthalmos

6. Diabetes mellitus
   a. Type I
   b. Type II
7. Diabetes insipidus
8. Cushing's syndrome

Standard 9

Students will describe the components and functions associated with blood.

Objective 1 Identify the components of blood and their functions.

1. Erythrocytes
   a. Shapes
   b. Function of hemoglobin
2. Leukocytes
   a. Granulocytes
      i. Neutrophils
      ii. Basophils
      iii. Eosinophils
   b. Agranulocytes
      i. Monocytes
      ii. Lymphocytes
3. Thrombocytes
4. Plasma

Objective 2 Describe the process of hemostasis.

1. Vascular spasm
2. Platelet plug formation
3. Coagulation

Objective 3 Contrast a thrombus and an embolus.

Objective 4 Identify the antigens found on the erythrocytes and the antibodies that determine the ABO blood types and the Rh factor.

Objective 5 Explain the following diseases and disorders associated with the blood.

1. Anemias
2. Nutritional
3. Pernicious
4. Hemorrhagic
5. Hemolytic
6. Sickle cell
7. Aplastic
8. Hemolytic disease of the newborn
9. Hemophilia
10. Leukemia

11. Mononucleosis
12. Polycythemia

Standard 10

Students will describe the structures and functions of the lymphatic system.

Objective 1 Identify the components of the lymphatic system.

1. Tonsils
2. Spleen
3. Thymus
4. Lymph nodes
5. Bone marrow
6. Lymph vessels

Objective 2 Describe how lymph is moved through the body.

Objective 3 Contrast antigens and antibodies.

Objective 4 Describe the general roles of T-cells and B-cells in the immune response.

Objective 5 Distinguish between types of immunity.

1. active
2. passive
3. natural
4. artificial

Objective 6 Explain the following diseases and disorders associated with the lymphatic system.

1. AIDS
2. Measles
3. Mumps
4. Rubella
5. Tetanus

Standard 10 Performance Evaluation included below (Optional)

Standard 11

Students will describe the structures and functions of the cardiovascular system.

Objective 1 List the general functions of the cardiovascular system.

Objective 2 Describe the layers of the heart.

1. Epicardium
2. Myocardium
3. Endocardium

Objective 3 Identify the chambers of the heart.

1. Atria
2. Ventricles

Objective 4 Identify the valves of the heart.

1. Tricuspid
2. Pulmonary semilunar
3. Bicuspid (mitral)
4. Aortic semilunar

Objective 5 Locate the great blood vessels of the heart.

1. Superior vena cava
2. Inferior vena cava
3. Pulmonary trunk
4. Pulmonary arteries
5. Pulmonary veins
6. Aorta
7. Branches of the aorta

Objective 6 Trace blood flow through the heart.

Objective 7 Contrast pulmonary and systemic circulation.

Objective 8 Identify the components of the conduction system of the heart and trace the pathway.

1. Sinoatrial (SA) node
2. Atrioventricular (AV) node
3. AV bundle (Bundle of His)
4. Bundle branches
5. Purkinje fibers

Objective 9 Sequence the principal events of the cardiac cycle in terms of systole and diastole.

Objective 10 Define cardiac output and identify factors that influence it.

1. Heart rate (HR)
2. Stroke volume (SV)

Objective 11 Contrast the structures and functions of arteries, capillaries, and veins.

Objective 12 Define pulse and identify the general location of arteries where pulse may be felt.

Objective 13 Describe blood pressure and how to measure it.

Objective 14 Identify the following diseases and disorders of the cardiovascular system.

1. Aneurysm
2. Arteriosclerosis
3. Atherosclerosis
4. Cerebrovascular accident/stroke (CVA)
5. Coronary artery disease
6. Hypertension
7. Murmur
8. Myocardial infarction

Standard 12

Students will describe the structures and functions associated with the respiratory system.

Objective 1 Identify the general functions of the respiratory system.

Objective 2 Sequence the organs of the respiratory system in the order which air will pass through them from the exterior.

1. Nose/mouth
2. Pharynx
3. Nasopharynx
4. Oropharynx
5. Laryngopharynx
6. Larynx
7. Trachea
8. Bronchi
9. Bronchioles
10. Alveolar duct
11. Alveoli

Objective 3 Identify the following structures associated with the larynx.

1. Epiglottis
2. Glottis
3. Hyoid bone
4. Thyroid cartilage
5. Cricoid cartilage
6. True vocal cords
7. False vocal cords

Objective 4 Identify the coverings of the lungs and the gross anatomical features of the lungs.

1. Apex
2. Base
3. Lobes
4. Visceral pleura
5. Parietal pleura
6. Pleural cavity

Objective 5 Identify the volumes and capacities of air exchanged during ventilation.

1. Tidal volume
2. Vital capacity

Objective 6 Differentiate between the following.

1. Ventilation
2. External respiration
3. Internal respiration

Objective 7 Describe the effects of carbon dioxide on ventilation.

Objective 8

1. Chronic Obstructive Pulmonary Disorder
   a. Emphysema
   b. Bronchitis
2. Asthma
3. Influenza
4. Lung cancer
5. Pneumonia
6. Sudden Infant Death Syndrome (SIDS)
7. Tuberculosis (TB)
8. Cystic Fibrosis (CF)
9. Respiratory Syncytial Virus (RSV)

Standard 13

Students will describe the structures and functions associated with the digestive system.

Objective 1 Identify the general functions of the digestive system.

Objective 2 Contrast chemical and mechanical digestion.

Objective 3 Differentiate between the following:

1. Alimentary canal structures
   a. Mouth
   b. Pharynx

c. Esophagus
d. Stomach
e. Small intestines
f. Large intestines
g. Rectum

h. Anus
2. Accessory structures
    a. Salivary glands (parotid)
    b. Pancreas
    c. Gallbladder
    d. Liver

Objective 4 Describe the functions of saliva and salivary amylase in digestion.

Objective 5 Identify the following parts of a typical tooth.

1. Crown
2. Neck
3. Root
4. Gingiva
5. Periodontal ligament
6. Enamel
7. Dentin
8. Pulp
9. Root canal

Objective 6 Define the following:

1. Deglutition
2. Mastication
3. Maceration
4. Segmentation
5. Peristalsis
6. Haustral churning

Objective 7 Identify the anatomical features of the stomach.

1. Fundus
2. Body
3. Pylorus
4. Rugae
5. Cardiac sphincter
6. Pyloric sphincter

Objective 8 Identify the basic components and functions of gastric juice.

1. Chief cells

    a. Pepsinogen
2. Parietal cells

    a. Hydrochloric acid
3. Goblet cells
    a. Mucus

Objective 9 Identify the location and digestive functions of the pancreas.

1. Pancreatic Islets
    a. endocrine
2. Acini Cells
    a. exocrine

Objective 10 Describe the function of bile (emulsification).

Objective 11 Identify the three sections of the small intestine and describe the functions.

1. Duodenum
2. Jejunum
3. Ileum

Objective 12 Identify the structures and sections of the large intestine and describe the functions.

1. Cecum
2. Colon
    a. Ascending
    b. Transverse
    c. Descending
    d. Sigmoid
3. Rectum
4. Anal canal

Objective 13 Identify the following diseases and disorders of the digestive system.

a. Appendicitis
b. Cirrhosis
c. Colorectal cancer
d. Gallstones
e. Hepatitis
f. Obesity
g. Ulcers
h. Celiac disease

i. Crohn’s disease
j. Irritable Bowel Syndrome (IBS)

Standard 14

Students will describe the structures and functions associated with the urinary system.

Objective 1 Identify the general functions of the urinary system.

Objective 2 Identify the four major organs of the urinary system.

1. Kidneys
2. Ureters
3. Bladder
4. Urethra

Objective 3 Identify the gross anatomy of the kidney.

1. Renal cortex
2. Renal medulla
3. Renal pyramids
4. Renal pelvis
5. Renal capsule
6. Calyces

Objective 4 Identify the microscopic structures of the nephron.

1. Renal corpuscle
    a. Glomerulus
    b. Glomerular (Bowman's) capsule
2. Afferent arteriole
3. Efferent arteriole
4. Renal tubule
    a. Proximal convoluted tubule
    b. Descending limb
    c. Nephron loop
    d. Ascending limb
    e. Distal convoluted tubule
    f. Collecting duct
5. Peritubular capillaries

Objective 5 Describe the three basic physiological processes and the structures involved in urine formation.

1. Filtration

2. Reabsorption
3. Secretion

Objective 6 Identify abnormal constituents of urine and possible causes of each.

1. Glucose
2. Ketones in excessive levels
3. Erythrocytes
4. Leukocytes
5. Bilirubin
6. Microbes
7. Albumin

Objective 7 Describe the methods of fluid intake and output.

1. Intake
    a. Oral
        i. Liquid
        ii. Solid
    b. Intravenous
    c. Metabolic
2. Output
    a. Urination (micturition or voiding)
    b. Sweat
    c. Feces
    d. Exhaled vapor

Objective 8 Explain the following diseases and disorders associated with the urinary system.

1. Glomerulonephritis
2. Incontinence
3. Kidney stones
4. Polyuria
5. Renal failure
6. Urinary tract infections (UTI)

Standard 15

Students will describe the structures and functions associated with the reproductive system.

Objective 1 Identify the general functions of the reproductive system.

Objective 2 Describe the anatomy of the male genitalia.

1. External
    a. Penis
    b. Scrotum
    c. Testes
2. Internal
    a. Epididymis
    b. Ductus deferens
    c. Ejaculatory duct
    d. Urethra
3. Accessory
    a. Seminal vesicles
    b. Prostate
    c. Bulbourethral gland

Objective 3 Describe the functions of testosterone in the male.

Objective 4 Describe the anatomy of the female reproductive structures.

1. External
    a. Vulva
    b. Labia majora
    c. Clitoris
    d. Labia minora
    e. Mons pubis
    f. Vestibule
2. Internal
    a. Ovaries
    b. Uterus
    c. Uterine tubes (Fallopian tubes)
        i. Infundibulum and fimbriae
        ii. Ampulla
        iii. Isthmus
    d. Vagina
3. Accessory
    a. Mammary glands
    b. Perineum

Objective 5 Describe the structures and function of the uterus.

1. Perimetrium

2. Myometrium
3. Endometrium
    a. Stratum functionalis
    b. Stratum basalis
4. Fundus
5. Cervix

Objective 6 Define the menstrual cycle including the ovarian and uterine cycles and changes that occur during menopause.

Objective 7 Describe the physiological effects of estrogens, progesterone, and relaxin.

Objective 8 Contrast the general outcomes of spermatogenesis vs. oogenesis.

Objective 9 Define the following sequence of events that occur during human development.

1. Fertilization
2. Zygote
3. Implantation
4. Embryo
5. Fetus

Objective 10 Identify the principal events associated with the three stages of labor.

1. Stage 1-dilation and effacement
2. Stage 2-delivery and birth
3. Stage 3-placental expulsion

Objective 11 Explain the following diseases and disorders of the reproductive system.

1. Reproductive cancers
    a. Breast
    b. Testicular
    c. Cervical
    d. Ovarian
    e. Prostate
    f. Uterine
2. Endometriosis
3. Impotence

4. Polycystic Ovarian Syndrome (PCOS)
5. Sexually Transmitted Infections (STI)
    a. Gonorrhea
    b. Syphilis
    c. Genital herpes
    d. Chlamydia
    e. Trichomoniasis
    f. Genital warts
    g. Human Papillomavirus (HPV)

Workplace Skills

- Communication
- Problem Solving
- Teamwork
- Critical Thinking
- Dependability
- Accountability
- Legal Requirements/expectations

Medical Anatomy and Physiology

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of 8 or higher on the rating scale. Students may be encouraged to repeat the objectives until they average 8 or higher.

Student's Name: _____

Class: _____

Performance standards rating scale

0	Limited skills	2	→	4	Moderate skills	6	→	8	High skills	10

Standard 1 – Body Plan and Organization Score:

- The student will explore careers in healthcare. The student will participate in a minimum of three career exploration experiences to investigate a variety of health care careers related to therapeutic services, diagnostic services, health informatics, support services, and biomedical research and development pathways. NOTE: Electronically delivered career exploration experiences are permissible.
- The student will provide an oral and/or written report for each career exploration.

Standard 2 – Basic Principles of Body Chemistry Score:

- The student will select a topic and defend their position on a CURRENT Medical Dilemma. (Essay, Debate, Etc.)

Standard 4 – Histology and the Integumentary System Score:

- Students will explore careers in healthcare. Students will participate in a minimum of three career exploration experiences to investigate a variety of health care careers related to therapeutic services, diagnostic services, health informatics, support services, and biomedical research and development pathways. NOTE: Electronically delivered career exploration experiences are permissible.
- Students will provide an oral and/or written report for each career exploration.

Standard 10 – Lymphatic System Score:

- Students will select a topic and defend their position on a current medical ethics dilemma.

Performance standard average score:

Evaluator Name: _____

Evaluator Title: _____

Evaluator Signature: _____

Date: _____