**DESCRIPTION**

Explore careers in health care and describe the body plan and organization and homeostasis. Explain basic principles of body chemistry. Describe basic concepts of structures and functions of cells, histology, and the integumentary system; the structures and functions of the skeletal system and its components; the structures and functions of the muscular system and its components; the structures and functions of the nervous system and special senses; the structures and functions associated with the endocrine system; the components and functions associated with blood, and the structures and functions of the lymphatic and cardiovascular systems; the structures and functions associated with the respiratory system; the structures and functions associated with the digestive system; and, the structures and functions associated with the urinary system.

<table>
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<tr>
<th>Total Test Questions: 68</th>
<th>Levels: Grades 10-12</th>
<th>Units of Credit: 1.0</th>
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<td>Prerequisites: None</td>
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**STANDARDS, OBJECTIVES, AND INDICATORS**

**STANDARD 1**  
11% of Exam Blueprint

- **STUDENTS WILL EXPLORE CAREERS IN HEALTH CARE AND DESCRIBE THE BODY PLAN AND ORGANIZATION AND HOMEOSTASIS.**

  **Objective 1:** Students will explore careers in health care.

  1. 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.

  **Objective 2:** Students will provide an oral and/or written report for each exploration utilizing the report outline located in the MAP curriculum.

  **Objective 3:** Students will select a topic and defend their position on a current medical or ethical dilemma.

  **Objective 4:** Contrast the sciences of anatomy and physiology.

  **Objective 5:** Describe the six level of structural organization in the human body (chemical, cellular, tissue, organ, system, organism).

  **Objective 6:** Describe metabolism and its anabolic and catabolic processes.

  **Objective 7:** Apply directional terms used in human anatomy (posterior/anterior, medial/lateral, proximal/distal, superficial/deep, superior/inferior).

  **Objective 8:** Apply commonly used planes to divide the body (sagittal, midsagittal, transverse [horizontal], frontal [coronal]).

  **Objective 9:** Identify the body cavities and locate the following organs within each cavity:

    1. **Dorsal Cavity**
       1. Vertebra—spinal cord
       2. Cranial—brain

    2. **Ventral Cavity**
       1. Thoracic—heart, lungs
       2. Mediastinum—heart, bronchi, esophagus, thymus
3. Pericardial—heart
4. Pleural—lungs
3. Abdominopelvic Cavity—liver, spleen, intestines, kidneys, stomach
4. Pelvic—intestines, urinary bladder, sex organs

Objective 10: 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—left lower quadrant—left ovary

Objective 11: Examine the relationship between homeostasis and stress.
Objective 12: Differentiate between negative and positive feedback mechanisms.

STANDARD 2

3% of Exam Blueprint

Diamond Students will explain basic principles of body chemistry.

Objective 1: Review the following terms and concepts (states of matter, elements, basic components of the atom [nucleus electrons, protons, and neutrons], ion [electrolyte]).
Objective 2: Identify the four major elements in the body (carbon, hydrogen, oxygen, nitrogen).
Objective 3: Differentiate between a compound and a molecule.
Objective 4: Differentiate between a cation and an anion.
Objective 5: Describe the characteristics of ionic, covalent, and hydrogen bonds.
Objective 6: Define pH.
Objective 7: Categorize acidic, basic, or neutral status based on the pH of a solution.
Objective 8: Distinguish between “neutral” pH and the “average” pH range of the blood (neutral pH = 7.0, average pH of blood = 7.35 to 7.45).
Objective 9: Describe the properties of water and how it is utilized in the human body (universal solvent, transport, lubricant, heat capacity chemical reactions).
Objective 10: Distinguish between inorganic and organic compounds (Inorganic compounds do not contain carbon, are small molecules, and usually form ionic bonds; organic compounds usually contain carbon, are large molecules, form covalent bonds, and are flammable.).
Objective 11: Describe the structures and functions of carbohydrates, proteins, lipids, and nucleic acids.
Objective 12: Describe how the body produces energy during cellular respiration (ATP <-> ADP + P + ENERGY).
STANDARD 3

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

Objective 1: Identify the four principle parts of a generalized animal cell and their functions (nucleus, cytosol, organelles, and cell membranes).

Objective 2: Describe the structure and function of the cell membrane.

Objective 3: Describe a selectively permeable membrane and factors which influence permeability.

Objective 4: Contrast intracellular and extracellular fluid in terms of location and composition.

Objective 5: Describe each of the following cellular transport processes and classify them as active or passive (Passive processes: diffusion, osmosis, facilitated diffusion, dialysis, and filtration; active processes: phagocytosis, exocytosis, and active transport).

Objective 6: Review the osmotic effects that occur when a cell is placed in an isotonic, hypotonic, or hypertonic solution.

Objective 7: Describe the function of the following structures within the cell (nucleolus, gene, chromatin, chromosome, DNA, ribosomes, endoplasmic reticulum, Golgi complex, mitochondria, lysosomes, vacuole, peroxisomes, microfilaments, microtubules, centrioles, centrosomes, flagella, cilia, microvilli).

Objective 8: Compare and contrast mitosis and meiosis.

Objective 9: Identify the general characteristics and functions of each of the four principle types of tissues (Epithelial—strategies for tissue identification [arrangement and cell shape]; connective—adipose, cartilage, dense fibrous, blood, bone; muscular—skeletal, smooth, cardiac, and Nervous).

Objective 10: Contrast exocrine and endocrine glands.

Objective 11: Differentiate between the four basic types of membranes (mucous, serous, synovial, cutaneous).

Objective 12: Describe the structures and functions of the integumentary system components (skin, glands, hair, and nails).

Objective 13: Describe the major layers of the skin (epidermis, dermis, subcutaneous [hypodermis]).

Objective 14: Describe the functions of sudoriferous (sweat) and sebaceous (oil) glands.

Objective 15: Identify the following diseases or disorders of the integumentary system (acne, skin cancers [basal cell carcinoma, squamous cell carcinoma, malignant melanoma], decubitus ulcers).

STANDARD 4

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 osteoblasts, osteocytes, and osteoclasts in bone growth and ossification.

Objective 3: Describe the features of a long bone (periosteum, diaphysis, epiphysis, medullary cavity, red marrow, yellow marrow, articular cartilage, endosteum, compact bone, spongy bone).
Objective 4: Identify the four shapes of bones with characteristics and examples of each (long, short, flat, irregular).

Objective 5: Describe and locate the following bone markings (foramen, meatus, sinus, fossa, condyle, tuberosity, trochanter, tubercle, process).

Objective 6: Describe the terms “suture” and “fontanel.”

Objective 7: Contrast the axial and appendicular skeletons.

Objective 8: Locate the following skull bones (mandible, maxilla, zygomatic, frontal, parietal, occipital, sphenoid, ethmoid, hyoid, temporal, mastoid process).

Objective 9: Contrast the average number, location, and function of each of the five groups of vertebrae.

Objective 10: Explain the structural classifications of articulations (fibrous, synovial, and cartilaginous).

Objective 11: Differentiate between ligaments and tendons.

Objective 12: Identify the following diseases or disorders of the skeletal system (herniated disk, osteoarthritis, osteoporosis, scoliosis, spina bifida).

STANDARD 5 10% of Exam Blueprint

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 (elasticity, excitability [irritability], extensibility, flexibility).

Objective 3: Contrast the general location, microscopic appearance, control and functions of the three specific types of muscle tissue (skeletal, smooth, cardiac).

Objective 4: Contrast thick and thin myofilaments.

Objective 5: Describe the sliding-filament theory of muscle contraction.

Objective 6: Describe what occurs at the neuromuscular junction.

Objective 7: Define the terms “origin” and “insertion.”

Objective 8: Explain the role of prime movers (agonists), antagonists, synergists, and fixators.

Objective 9: Describe the locations and functions of the following skeletal muscles (biceps branchii, triceps branchii, sternocleidomastoid, trapezius, deltoid, diaphragm, pectoralis major, latissimus dorsi, gastrocnemius, hamstrings, quadriceps, gluteus maximus).

Objective 10: Identify the following diseases and disorders of the muscular system (fibromyalgia, muscular dystrophy, shin splints).

STANDARD 6 9% of Exam Blueprint

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

Objective 1: Restate the three broad functions of the nervous system (sensory, integration, motor).
Objective 2: Describe the general organization of the nervous system.

Objective 3: List the functions and structures of neurons and neuroglial cells (astrocytes, microglia, oligodendrocytes, ependymal cells, Schwann cells).

Objective 4: Sequence the major events when the nerve impulse (action potential) is initiated and transmitted through a neuron.

Objective 5: Contrast white and gray matter of nervous tissue.

Objective 6: Identify the structures responsible for the maintenance and protection of the central nervous system (meninges [dura mater, arachnoid mater, and pia mater]).

Objective 7: Explain the role of each of the components of a reflex arc (reflex, reflex arc, receptor, sensory neuron, association [interneuron] neuron, motor neuron, effector).

Objective 8: Identify the four principle parts of the brain (cerebrum, cerebellum, brain stem, diencephalon).

Objective 9: Describe the location and function of CSF (ventricles, subarachnoid space).

Objective 10: Describe the functions of the three structures of the brain stem (medulla oblongata, pons, midbrain).

Objective 11: Describe the structures of and functions of the diencephalon (thalamus, hypothalamus).

Objective 12: Describe the locations and functions of the four lobes of the cerebrum (frontal, parietal, temporal, occipital).

Objective 13: Explain the major functions of the cerebrum.

Objective 14: Identify the following diseases or disorders of the nervous system (ALS, Alzheimer’s, bacterial meningitis, cerebral palsy, epilepsy, multiple sclerosis, Parkinson’s).

Objective 15: Describe the principal anatomical structures of the eye (accessory structures [eyelid, conjunctiva, lacrimal apparatus, extrinsic muscles], layers of the eyeball [fibrous tunic—sclera, cornea], vascular tunic [choroid, ciliary body, iris, lens, pupil], nervous tunic [retina]).

Objective 16: Describe the principal anatomical structures of the ear (outer ear [auricle, auditory canal], middle ear [ tympanic cavity, tympanic membrane, auditory (Eustachian) tube, auditory ossicles (malleus, incus, stapes)], inner ear [bony labyrinth, membranous labyrinth, semicircular canals, vestibule, cochlea, Organ of Corti]).

Objective 17: Identify the following disease or disorders associated with special senses (presbyopia, myopia, hyperopia, cataracts, conjunctivitis, deafness [conductive sensorineural], glaucoma, macular degeneration, middle ear infection, strabismus, tinnitus, vertigo).

STANDARD 7

4% of Exam Blueprint

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 locations, secretions, and functions of the major endocrine glands (pituitary gland [GH, TSH, ACTH], thyroid gland [thyroxine], adrenals [epinephrine, norepinephrine, cortisol, pancreas [glucagon, insulin]).

Objective 4: Identify the following diseases or disorders of the endocrine system (acromegaly, cretinism, diabetes mellitus, dwarfism, gigantism, hyperthyroidism, hypothyroidism, myxedema).

STANDARD 8 12% of Exam Blueprint

**STUDENTS WILL DESCRIBE THE COMPONENTS AND FUNCTIONS ASSOCIATED WITH BLOOD, AND THE STRUCTURES AND FUNCTIONS OF THE LYMPHATIC AND CARDIOVASCULAR SYSTEMS.**

Objective 1: Identify the components of blood and their functions (erythrocytes, leukocytes, thrombocytes, plasma).

Objective 2: Describe erythrocytes, including the structure of hemoglobin.

Objective 3: Define “leukocyte” and list the two major groups with their cell types (granulocytes—neutrophils, basophils, eosinophils, and agranulocytes—monocytes, lymphocytes).

Objective 4: Describe the process of hemostasis (vascular spasm, platelet plug formation, coagulation).

Objective 5: Contrast a thrombus and an embolus.

Objective 6: Identify the antigens found on the erythrocytes and the antibodies that determine the ABO blood types and the Rh factor.

Objective 7: Identify the following diseases or disorders associated with the blood (anemias, hemolytic disease of the newborn, hemophilia, leukemia, mononucleosis, polycythemia).

Objective 8: Identify the components of the lymphatic system (tonsils, spleen, thymus, lymph nodes, bone marrow, lymph vessels).

Objective 9: Describe how lymph is moved through the body.

Objective 10: Contrast antigens and antibodies.

Objective 11: Describe the roles of T-cells and B-cells in the immune response.

Objective 12: Distinguish between active and passive immunity, and natural vs. artificial acquisition of immunity.

Objective 13: Identify the following diseases or disorders associated with the lymphatic system (AIDS, measles, mumps, rubella, tetanus).

Objective 14: List the general functions of the cardiovascular system.

Objective 15: Describe the layers of the heart (epicardium, myocardium, endocardium).

Objective 16: Identify the chambers of the heart.

Objective 17: Locate the great blood vessels of the heart (superior vena cava, inferior vena cava, pulmonary trunk, pulmonary arteries, pulmonary veins, aorta, branches of the aorta).

Objective 18: Identify the valves of the heart (tricuspid, pulmonary semilunar, bicuspid [mitral], aortic semilunar).

Objective 19: Trace blood flow through the heart.
STANDARD 9 7% of Exam Blueprint

◊ 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 (nose or mouth, pharynx, larynx, trachea, bronchi, bronchioles, alveolar duct, alveoli).
Objective 3: Identify the three regions of the pharynx (nasopharynx, oropharynx, laryngopharynx).
Objective 4: Identify the following anatomical features of the larynx (epiglottis, glottis, hyoid bone, thyroid cartilage, circoid cartilage, vocal cords).
Objective 5: Identify the coverings of the lungs and the gross anatomical features of the lungs (apex, base, lobes, visceral pleura, parietal pleura, pleural cavity).
Objective 6: Identify the site at which gas exchange occurs in the lungs (alveoli).
Objective 7: Identify the volumes and capabilities of air exchanged during ventilation (tidal volume, vital capacity).
Objective 8: Differentiate between ventilation, external respiration, and internal respiration.
Objective 9: Describe the effects of carbon dioxide on ventilation.
Objective 10: Identify the following diseases or disorders of the respiratory system (emphysema, influenza, lung cancer, pneumonia, SIDS, tuberculosis).

STANDARD 10 11% of Exam Blueprint

◊ 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 alimentary canal structures (mouth, pharynx, esophagus, stomach, small intestines, large intestines, rectum, anus) and the accessory structures (salivary glands [parotid], pancreas, gallbladder, liver).
Objective 4: Describe the functions of saliva and salivary amylase in digestion.

Objective 5: Identify the following parts of a typical tooth (crown, neck, root, gingival, periodontal ligament, enamel, dentin, pulp, root canal).

Objective 6: Define deglutition, mastication, maceration, segmentation, peristalsis, and haustral churning.

Objective 7: Identify the anatomical features of the stomach (fundus, body, pylorus, rugae, cardiac sphincter, pyloric sphincter).

Objective 8: Identify the basic components of gastric juice (pepsin, hydrochloric acid, and mucus).

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

Objective 10: Describe the function of bile (emulsification).

Objective 11: Identify the three sections of the small intestine (duodenum, jejunum, ileum).

Objective 12: Identify the structures and sections of the large intestine (cecum, colon [ascending, transverse, descending, sigmoid], rectum, anal canal).

Objective 13: Identify the following diseases or disorders of the digestive system (appendicitis, cirrhosis, colorectal cancer, gallstones, hepatitis, obesity, ulcers).

STANDARD 11 7% of Exam Blueprint

◊ 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 (kidneys, ureters, bladder, urethra).

Objective 3: Identify the gross anatomy of the kidney (renal cortex, renal medulla, renal pyramids, renal pelvis).

Objective 4: Identify the microscopic structures of the nephron (renal corpuscle, glomerulus, glomerular [Bowman’s] capsule, afferent arteriole, efferent arteriole, renal tubule [proximal convoluted tubule, descending limb, nephron loop, ascending limb, distal convoluted tubule, and collecting duct], peritubular capillaries).

Objective 5: Describe the three basic physiological processes and the structures involved in urine formation (filtration, reabsorption, secretion).

Objective 6: Identify abnormal constituents of urine (glucose, ketones, erythrocytes, leukocytes, bilirubin, microbes).

Objective 7: Describe the methods of fluid intake (oral [liquid and solid], intravenous, metabolic; and output [micturition, voiding, sweat, feces, exhaled vapor]).

Objective 8: Identify the following diseases or disorders associated with the urinary system (cystitis, diabetes insipidus, glomerulonephritis, incontinence, kidney stones, renal failure, urinary tract infections).

STANDARD 12 7% of Exam Blueprint

◊ 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 male genitalia.
Objective 3: Identify the function of the testes.
Objective 4: Identify the functions of testosterone in the male.
Objective 5: Describe the anatomy of the female reproductive system.
Objective 6: Identify the functions of the ovaries.
Objective 7: Identify the structures and functions of the uterine (Fallopian) tubes, including fimbriae and infundibulum.
Objective 8: Describe the structures and functions of the uterus (perimetrium, myometrium, endometrium, fundus, cervix).
Objective 9: Define the menstrual cycle, including the ovarian and uterine cycles and changes that occur during menopause.
Objective 10: Describe the physiological effects of estrogens, progesterone and relaxin.
Objective 11: Contrast the general outcomes of spermatogenesis vs. oogenesis.
Objective 12: Define the following sequence of events that occur during human development (fertilization, zygote, implantation, embryo, fetus).
Objective 13: Identify the principal events associated with the three stage of labor (Stage 1: dilation and effacement, Stage 2: delivery and birth, Stage 3: placental expulsion).
Objective 14: Identify the following diseases or disorders of the reproductive system (reproductive cancers [breast, testicular, cervical, ovarian, prostate], endometriosis, impotence, Sexually Transmitted Infections—STIs [gonorrhea, syphilis, genital herpes, Chlamydia, trichomoniasis, genital warts, HPV—Human Papilloma Virus]).
Performance Standard Evaluation Checklist

Student Name ________________________________
Instructor’s Name ________________________________
School ________________________________ District ________________________________

Performance Rating Scale:

1  2  3  4  5  6  7  8  9  10

Limited Skills.............................Moderate Skills.................................High Skills

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 written 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** for the following elements:

<table>
<thead>
<tr>
<th>PERFORMANCE SKILLS STANDARDS</th>
<th>Score:</th>
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<tbody>
<tr>
<td>STANDARD 1 – Explore three careers in health care.</td>
<td>Score:</td>
</tr>
<tr>
<td>STANDARD 2 – Report on at least three Work-based Learning experiences.</td>
<td>Score:</td>
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<tr>
<td>Activity (ex. Guest Speaker, Field Study, Career Fair, Job Shadow, Internship, Personal Interview with Health Care Worker, etc.)</td>
<td>Report Date</td>
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<td>STANDARD 3 – Select a topic and defend their position on a current medical ethical dilemma.</td>
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<tr>
<td>PERFORMANCE STANDARD AVERAGE</td>
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