Utah CTE

Medical Anatomy and Physiology: Grades 10-12 (2018)

Body Plan and Organization-Students will explore and describe the body plan, organization, and homeostasis. 1

1. **Contrast the sciences of anatomy with physiolog** 1.1

2. **Describe the six levels of structural organization of the human body and give an example of each level.** 1.2
   - a Chemical 1.2.A
   - b Cellular 1.2.B
   - c Tissue 1.2.C
   - d Organ 1.2.D
   - e System 1.2.E
   - f Organism 1.2.F

3. **Describe the following:** 1.3
   - a Metabolism 1.3.A
     1. Anabolic process 1.3.A.1
     2. Catabolic process 1.3.A.2

4. **Apply directional terms used in human anatomy.** 1.4
   - a Posterior/Anterior 1.4.A
   - b Medial/Lateral 1.4.B
   - c Proximal/Distal 1.4.C
   - d Superficial/Deep 1.4.D
   - e Superior/Inferior 1.4.E

5. **Apply commonly used planes to divide the body.** 1.5
   - a Sagittal 1.5.A
   - b Midsagittal 1.5.B
   - c Transverse (horizontal) 1.5.C
   - d Frontal (coronal) 1.5.D

6 **Identify the body cavities and locate the following organs within each cavity.** 1.6

- a Dorsal Cavity 1.6.A
  - 1 Vertebral - Spinal Cord 1.6.A.1
  - 2 Cranial - Brain 1.6.A.2
- b Ventral Cavity 1.6.B
  - 1 Thoracic - Heart & Lungs 1.6.B.1
    - 1 Mediastinum-heart, bronchi, esophagus, thymus. 1.6.B.1.1
    - 2 Pericardial-heart 1.6.B.1.2
    - 3 Pleural-lungs 1.6.B.1.3
- c Abdominopelvic Cavity-liver, spleen, intestines, kidneys, stomach 1.6.C
  - 1 Abdominal-liver, spleen, intestines, kidneys, stomach 1.6.C.1
  - 2 Pelvic-intestines, urinary bladder, sex organs 1.6.C.2

7 **Identify the major organ(s) in each abdominal quadrant.** 1.7

- a RUQ-right upper quadrant-liver, gallbladder, right kidney 1.7.A
- b RLQ-right lower quadrant-cecum, appendix, right ovary 1.7.B
- c LUQ-left upper quadrant-spleen, stomach, left kidney 1.7.C
- d LLQ-lower left quadrant-left ovary 1.7.D

8 **Examine the relationship between homeostasis and stress.** 1.8

9 **Differentiate between negative and positive mechanisms. Give examples of each.** 1.9

- a Be able to describe the following: 1.9.A
  - 1 Childbirth 1.9.A.1
  - 2 Breast feeding 1.9.A.2
  - 3 Blood clotting 1.9.A.3

Basic Principles of Body Chemistry-Students will explain basic principles of body chemistry. 2

1. **Review the following terms and concepts.** 2.1
   - a. States of Matter 2.1.A
   - b. Elements 2.1.B
   - c. Basic components of the atom 2.1.C
     1. Nucleus 2.1.C.1
     2. Electrons 2.1.C.2
     3. Protons 2.1.C.3
     4. Neutrons 2.1.C.4
   - d. Ion 2.1.D
     1. Electrolyte 2.1.D.1

2. **Identify the four major elements in the body.** 2.2
   - a. Carbon 2.2.A
   - b. Hydrogen 2.2.B
   - c. Oxygen 2.2.C
   - d. Nitrogen 2.2.D

3. **Differentiate between:** 2.3
   - a. Compound 2.3.A
   - b. Molecule 2.3.B

4. **Differentiate between:** 2.4
   - a. Cation 2.4.A
   - b. Anion 2.4.B

5. **Describe the characteristics of bonds. (no longer place any emphasis on which is the strongest type)** 2.5
   - a. Ionic 2.5.A
   - b. Covalent 2.5.B
   - c. Hydrogen 2.5.

6. **Define pH.** 2.6

7. **Categorize the following based on the pH of a solution:** 2.7
   - a. Acidic 2.7.A
   - b. Basic 2.7.B
   - c. Neutral 2.7.C

8 **Distinguish between "neutral" pH and the "average" pH range of the blood.** 2.8

- a Neutral pH=7.0 2.8.A
- b Average pH of blood=7.35 to 7.45 2.8.B

9 **Describe the properties of water and how it is utilized in the human body.** 2.9

- a Universal solvent 2.9.A
- b Transport 2.9.B
- c Lubricant 2.9.C
- d Heat capacity 2.9.D
- e Chemical reactions 2.9.E

10 **Distinguish between:** 2.10

- a Inorganic compounds-do not contain carbon, small molecules, usually form ionic bonds 2.10.A
- b Organic compounds-usually contain carbon, large molecules, form covalent bonds, flammable 2.10.B

11 **Describe the structures and functions of the following and give an example of each:** 2.11

- a Carbohydrates 2.11.A
- b Proteins 2.11.B
- c Lipids 2.11.C
- d Nucleic acids 2.11.D
  1. RNA 2.11.D.1
  2. DNA 2.11.D.2
- e Amino acids 2.11.E

12 **Describe how the body produces energy during cellular respiration.** 2.12

- a ATP < - -> ADP + P + ENERGY 2.12.A

Cells-Students will describe basic concepts of structures and functions of cells. 3

1 **Identify the four principle parts of a generalized animal cell and their functions.** 3.1

- a Nucleus 3.1.A
- b Cytosol 3.1.B
- c Organelles 3.1.C
- d Cell membrane 3.1.D

2 **Describe the structure and function of the cell membrane.** 3.2

3 **Describe a selectively permeable membrane and factors which influence permeability.** 3.3

4 **Contrast intracellular and extracellular fluid in terms of location and composition.** 3.4

5 **Describe each of the following cellular transport processes and classify them as active or passive.** 3.5

- a Passive processes 3.5.A
  - 1 Diffusion 3.5.A.1
  - 2 Osmosis 3.5.A.2
  - 3 Facilitated diffusion 3.5.A.3
  - 4 Dialysis 3.5.A.4
  - 5 Filtration 3.5.A.5
- b Active processes 3.5.B
  - 1 Phagocytosis 3.5.B.1
  - 2 Exocytosis 3.5.B.2
  - 3 Active transport 3.5.B.

6 **Review the osmotic effects that occur when a cell is placed in the following:** 3.6

- a Isotonic solution 3.6.A
- b Hypotonic solution 3.6.B
- c Hypertonic solution 3.6.

7 **Describe the function of the following structures within the cell.** 3.7

- a Nucleolus 3.7.A
- b DNA 3.7.B
- c RNA 3.7.C
- d Gene 3.7.D
- e Chromatin 3.7.E
- f Chromosome 3.7.F
- g Ribosomes 3.7.G
- h Rough endoplasmic reticulum 3.7.H
- i Smooth endoplasmic reticulum 3.7.I
- j Golgi complex 3.7.J
- k Vesicle (vacuole) 3.7.K
- l Lysosomes 3.7.L
- m Peroxisomes 3.7.M
- n Mitochondria 3.7.N
- o Cytoskeleton 3.7.O
  - 1 Microfilaments 3.7.O.1
  - 2 Intermediate filaments 3.7.O.2
  - 3 Microtubules 3.7.O.3
- p Centrosomes 3.7.P
- q Centrioles 3.7.Q
- r Cellular surface variants 3.7.R
  - 1 Microvilli (absorption) 3.7.R.1
  - 2 Cilia (transports products along the surface of the cell, "crowd surfers") 3.7.R.2
  - 3 Flagella (transports the cell) 3.7.R.

8 **Compare and contrast:** 3.8

- a Mitosis 3.8.A
- b Meiosis 3.8.B

Histology & Integumentary System- Students will describe basic concepts of structures and functions of histology, and the integumentary system. 4

1 **Identify the general characteristics and functions of each of the four principle types of tissues.** 4.1

- a Epithelial-strategies for tissue identification (arrangement & cell shape) 4.1.A
- b Connective-adipose, cartilage, dense fibrous, blood, bone 4.1.B
- c Muscular-skeletal, smooth, cardiac 4.1.C
- d Nervous 4.1.D

2 **Contrast the following:** 4.2

- a Exocrine glands 4.2.A
- b Endocrine glands 4.2.B

3 **Differentiate between the four basic types of membranes.** 4.3

- a Mucous 4.3.A
- b Serous 4.3.B
- c Synovial 4.3.C
- d Cutaneous 4.3.D

4 **Describe the structures and functions of the integumentary system components.** 4.4

- a Skin 4.4.A
- b Glands 4.4.B
- c Hair 4.4.C
- d Nails 4.4.

5 **Describe the major layers of skin.** 4.5

- a Epidermis 4.5.A
- b Dermis 4.5.B
- c Subcutaneous (hypodermis) 4.5.C

6 **Describe the functions of the following:** 4.6

- a Sudoriferous (sweat) glands 4.6.A
- b Sebaceous (oil) glands 4.6.B

7 **Identify the following diseases and disorders of the integumentary system.** 4.7

- a Skin cancers 4.7.A
  - 1 Basal cell carcinoma 4.7.A.1
  - 2 Squamous cell carcinoma 4.7.A.2
  - 3 Malignant melanoma 4.7.A.3
- b Decubitus ulcers 4.7.B
- c Eczema 4.7.C
- d Lesion 4.7.D
- e Burns 4.7.E
  - 1 1st degree 4.7.E.1
  - 2 2nd degree 4.7.E.2
  - 3 3rd degree 4.7.E.3

Performance Skills

- a 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.
- b Students will provide an oral and/or written report for each career exploration.

Skeletal System- Students will describe the structures and functions of the skeletal system and its components. 5

1 **Identify the general functions of the skeletal system.** 5.1

2 **Identify the roles of the following in bone growth and ossification:** 5.2

- a Osteoblasts 5.2.A
- b Osteocytes 5.2.B
- c Osteoclasts 5.2.C

3 **Describe the features of a long bone.** 5.3

- a Periosteum 5.3.A
- b Diaphysis 5.3.B
- c Epiphysis 5.3.C
- d Medullary cavity 5.3.D
- e Red marrow 5.3.E
- f Yellow marrow 5.3.F
- g Articular cartilage 5.3.G
- h Endosteum 5.3.H
- i Compact bone 5.3.I
- j Spongy bone 5.3.J

4 **Identify the four shapes of bones with characteristics and examples of each.** 5.4

- b Short 5.4.B
- a Long 5.4.A
- c Flat 5.4.C
- d Irregular 5.4.D

5 **Describe and locate the following bone markings.** 5.5

- a Foramen 5.5.A
- b Meatus 5.5.B
- c Sinus 5.5.C
- d Fossa 5.5.D
- e Condyle 5.5.E
- f Tuberosity 5.5.F
- g Trochanter 5.5.G
- h Tubercle 5.5.H
- i Process 5.5.I

6 **Describe and differentiate between the following terms:** 5.6

- a Suture 5.6.A
- b Fontanel 5.6.B

7 **Contrast the axial and appendicular skeletons.** 5.7

8 **Locate the following bones.** 5.8

- a Mandible 5.8.A
- b Maxilla 5.8.B
- c Zygomatic 5.8.C
- d Frontal 5.8.D
- e Parietal 5.8.E
- f Occipital 5.8.F
- g Sphenoid 5.8.G
- h Ethmoid 5.8.H
- i Hyoid 5.8.I
- j Temporal 5.8.J
- k Clavicle 5.8.K
- l Scapula 5.8.L
- m Sternum 5.8.M
- n Ribs 5.8.N
- o Pubic bone 5.8.O
  - 1 Ilium 5.8.O.1
  - 2 Ischium 5.8.O.2
  - 3 Pubis 5.8.O.3
- p Femur 5.8.P
- q Patella 5.8.Q
- r Tibia 5.8.R
- s Fibula 5.8.S
- t Tarsals 5.8.T
- u Metatarsals 5.8.U
- v Phalanges 5.8.V
- w Humerus 5.8.W
- x Ulna 5.8.X
- y Radius 5.8.Y
- z Carpals 5.8.Z
- aa Metacarpals 5.8.AA
- ab Vertebrae 5.8.AB

9 **Contrast the average number, location, and function of each of the five groups of vertebrae.** 5.9

- a Cervical 5.9.A
- b Thoracic 5.9.B
- c Lumbar 5.9.C
- d Sacral 5.9.D
- e Coccygeal 5.9.E

10 **Explain the structural and functional classifications of articulations.** 5.10

- a Fibrous 5.10.A
- b Synovial 5.10.B
- c Cartilaginous 5.10.C
- d Amphiarthrotic 5.10.D
- e Diarthrotic 5.10.E
- f Synarthrotic 5.10.F

11 **Differentiate between ligaments and tendons.** 5.11

12 **Identify the following diseases and disorders of the skeletal system.** 5.12

- a Herniated disk 5.12.A
- b Osteoarthritis 5.12.B
- c Osteoporosis 5.12.C
- d Scoliosis 5.12.D
- e Kyphosis 5.12.E
- f Lordosis 5.12.F
- g Spina bifida 5.12.G
- h RA (Rheumatoid arthritis) 5.12.H

Muscular System- Students will describe the structures and functions of the muscular system and its components. 6

1 **Identify the general functions of the muscular system.** 6.1

2 **Describe the four characteristics of muscle tissue.** 6.2

- a Elasticity 6.2.A
- b Excitability (irritability) 6.2.B
- c Extensibility 6.2.C
- d Flexibility 6.2.D

3 **Contrast the general location, microscopic appearance, control, and functions of the three specific types of muscle tissue.** 6.3

- a Skeletal 6.3.A
- b Smooth 6.3.B
- c Cardiac 6.3.C

4 **Contrast thick and thin myofilaments.** 6.4

- a Actin 6.4.A
- b Myosin 6.4.B

5 **Describe the sliding-filament theory of muscle contraction.** 6.5

6 **Describe what occurs at the neuromuscular junction.** 6.6

7 **Define the following terms:** 6.7

- a Origin 6.7.A
- b Insertion 6.7.B

8 **Explain the role of the following:** 6.8

- a Prime movers (agonists) 6.8.A
- b Antagonists 6.8.B
- c Synergist 6.8.C
- d Fixators 6.8.D

9 **Describe the locations and functions of the following skeletal muscles:** 6.9

- a Biceps brachii 6.9.A
- b Triceps brachii 6.9.B
- c Brachialis 6.9.C
- d Flexors 6.9.D
- e Extensors 6.9.E
- f Pronator 6.9.F
- g Supinator 6.9.G
- h Rotator cuff 6.9.H
  - 1 Supraspinatus 6.9.H.1
  - 2 Infraspinatus 6.9.H.2
  - 3 Teres minor 6.9.H.3
  - 4 Subscapularis 6.9.H.4
- i Sternocleidomastoid 6.9.I
- j Trapezius 6.9.J
- k Deltoid 6.9.K
- l Diaphragm 6.9.L
- m Rectus abdominis 6.9.M
- n Pectoralis major 6.9.N
- o Latissimus dorsi 6.9.O
- p External oblique 6.9.P
- q Gastrocnemius 6.9.Q
- r Tibialis anterior 6.9.R
- s Soleus 6.9.S
- t Hamstrings 6.9.T
  - 1 Semimembranosus 6.9.T.1
  - 2 Semitendinosus 6.9.T.2
  - 3 Biceps femoris 6.9.T.3
- u Quadriceps 6.9.U
  - 1 Rectus femoris 6.9.U.1
  - 2 Vastus lateralis 6.9.U.2
  - 3 Vastus medialis 6.9.U.3
  - 4 Vastus intermedius 6.9.U.4
- v Gluteus maximus 6.9.V

w Gluteus medius 6.9.W

x Sartorius 6.9.X

y Gracilis 6.9.Y

z Masseter 6.9.Z

10 Identify the following diseases and disorders of the muscular system. 6.10

a Fibromyalgia 6.10.A

b Muscular dystrophy 6.10.B

c Medial tibial stress syndrome 6.10.C

d Compare and contrast the following, describe the three degrees of injury: 6.10.D

1 Sprain 6.10.D.1

2 Strain 6.10.D.2

Nervous System/Special Senses-Students will describe the structures and functions of the nervous system and special senses. 7

1 Restate the three broad functions of the nervous system. 7.1

a Sensory 7.1.A

b Integration 7.1.B

c Motor 7.1.C

2 Describe the general organization of the nervous system. 7.2

a Central Nervous System (CNS) 7.2.A

1 Brain 7.2.A.1

2 Spinal Cord 7.2.A.2

b Peripheral Nervous System (PNS) 7.2.B

1 Spinal nerves 7.2.B.1

1 31 pairs 7.2.B.1.1

2 Cranial nerves 7.2.B.2

1 I-XII 7.2.B.2.1

3 Subdivisions 7.2.B.3

1 Autonomic Nervous System (ANS) 7.2.B.3.1

1 Sympathetic 7.2.B.3.1.1

2 Parasympathetic 7.2.B.3.1.2

2 Somatic Nervous System 7.2.B.3.2

3 **List the functions and structures of neurons and neuroglial cells.** 7.3

- a Neuron 7.3.A
- b Astrocytes 7.3.B
- c Microglia 7.3.C
- d Oligodendrocytes 7.3.D
- e Ependymal cells 7.3.E
- f Schwann cells 7.3.F
- g Satellite cells 7.3.G

4 **Contrast white and gray matter of nervous tissue.** 7.4

5 **Describe the location and function of CSF.** 7.5

- a Ventricles 7.5.A
  - 1 Choroid Plexus 7.5.A.1
- b Subarachnoid space 7.5.B

6 **Identify the structures responsible for the maintenance and protection of the central nervous system.** 7.6

- a Meninges 7.6.A
  - 1 Dura mater 7.6.A.1
  - 2 Arachnoid mater 7.6.A.2
  - 3 Pia mater 7.6.A.3

7 **Identify the four principle parts of the brain.** 7.7

- a Cerebrum 7.7.A
- b Cerebellum 7.7.B
- c Brain stem 7.7.C
- d Diencephalon 7.7.D

8 **Describe the functions of the three structures of the brain stem.** 7.8

- a Medulla oblongata 7.8.A
- b Pons 7.8.B
- c Midbrain 7.8.

9 **Describe the structures and functions of the diencephalon.** 7.9

- a Thalamus 7.9.A
- b Hypothalamus 7.9.B

10 **Describe the locations and functions of the four lobes of the cerebrum.** 7.10

- a Frontal 7.10.A
- b Parietal 7.10.B
- c Temporal 7.10.C
- d Occipital 7.10.D

11 **Explain the major functions of the cerebellum.** 7.11

12 **Sequence the major events when the nerve impulse (action potential) is initiated and transmitted through a neuron.** 7.12

- a All or None Principle 7.12.A

13 **Explain the role of each of the components of a reflex arc.** 7.13

- a Reflex 7.13.A
- b Reflex arc 7.13.B
- c Receptor 7.13.C
- d Sensory neuron 7.13.D
- e Association (interneuron) neuron 7.13.E
- f Motor neuron 7.13.F
- g Effector 7.13.G

14 **Identify the following diseases and disorders of the nervous system.** 7.14

- a ALS 7.14.A
- b Alzheimer's 7.14.B
- c Bacterial meningitis 7.14.C
- d Cerebral palsy 7.14.D
- e Epilepsy 7.14.E
- f Multiple sclerosis 7.14.F
- g Guillain-Barre syndrome 7.14.G
- h Parkinson's 7.14.H
- i Cerebral Vascular Accident (CVA)-stroke 7.14.I

15 Describe the principle anatomical structures of the eye. 7.15

- a Accessory structures 7.15.A
  - 1 Eyelid 7.15.A.1
  - 2 Conjunctiva 7.15.A.2
  - 3 Lacrimal apparatus 7.15.A.3
  - 4 Extrinsic muscles 7.15.A.4
- b Layers of the eyeball 7.15.B
  - 1 Fibrous tunic 7.15.B.1
    - 1 Sclera 7.15.B.1.1
    - 2 Cornea 7.15.B.1.2
  - 2 Vascular tunic 7.15.B.2
    - 1 Choroid 7.15.B.2.1
    - 2 Ciliary body 7.15.B.2.2
    - 3 Iris 7.15.B.2.3
    - 4 Lens 7.15.B.2.4
    - 5 Pupil 7.15.B.2.5
  - 3 Nervous tunic 7.15.B.3
    - 1 Retina 7.15.B.3.1

16 Describe the principle anatomical structures of the ear. 7.16

- a Outer ear 7.16.A
  - 1 Auricle 7.16.A.1
  - 2 Auditory canal 7.16.A.2
- b Middle ear 7.16.B
  - 1 Tympanic cavity 7.16.B.1
  - 2 Tympanic membrane 7.16.B.2
  - 3 Auditory (Eustachian) tube 7.16.B.3
  - 4 Auditory ossicles 7.16.B.4
    - 1 Malleus 7.16.B.4.1
    - 2 Incus 7.16.B.4.2
    - 3 Stapes 7.16.B.4.3
  - 5 Inner ear 7.16.B.5
    - 1 Bony labyrinth 7.16.B.5.1
    - 2 Membranous labyrinth 7.16.B.5.2
    - 3 Semicircular canals 7.16.B.5.3
    - 4 Vestibule 7.16.B.5.4
    - 5 Cochlea 7.16.B.5.5
    - 6 Organ of Corti 7.16.B.5.6

17 **Identify the following diseases and disorders associated with special senses.** 7.17

- a Ametropia-abnormal refracted light 7.17.A
  - 1 Myopia 7.17.A.1
  - 2 Hyperopia 7.17.A.2
  - 3 Presbyopia 7.17.A.3
  - 4 Cataracts 7.17.A.4
  - 5 Conjunctivitis 7.17.A.5
  - 6 Strabismus 7.17.A.6
  - 7 Glaucoma 7.17.A.7
  - 8 Macular degeneration 7.17.A.8
  - 9 Vertigo 7.17.A.9
  - 10 Tinnitus 7.17.A.10
  - 11 Middle ear infection (Otitis Media) 7.17.A.11
  - 12 Deafness 7.17.A.12
    - 1 Conductive 7.17.A.12.1
    - 2 Sensorineural 7.17.A.12.2

ENDOCRINE SYSTEM- Students will describe the structures and functions associated with the endocrine system. 8

1 **Identify the general functions of the endocrine system.** 8.1

2 **Describe a "hormone" and how it functions in the body.** 8.2

3 **Describe a "hormone" and how it functions in the body.** 8.3

a Hypothalamus 8.3.A

1 Growth Hormone Releasing Hormone (GHRH)-targets anterior pituitary 8.3.A.1

2 Thyrotropin Releasing Hormone (TRH)-targets anterior pituitary 8.3.A.2

3 Corticotropic Releasing Hormone (CRH)-target anterior pituitary 8.3.A.3

4 Antidiuretic Hormone (ADH) 8.3.A.4

1 Produced in hypothalamus 8.3.A.4.1

2 Stored in posterior pituitary 8.3.A.4.2

5 Oxytocin Hormone (Oxt) 8.3.A.5

1 Produced in hypothalamus 8.3.A.5.1

2 Stored in posterior pituitary 8.3.A.5.2

b Pituitary Gland-found in the hypophyseal fossa "Sella Turcica" 8.3.B

1 Anterior Pituitary (adenohypophysis) 8.3.B.1

1 Human Growth Hormone (HGH) 8.3.B.1.1

1 Targets cells stimulating growth 8.3.B.1.1.1

2 Thyroid Stimulating Hormone (TSH) 8.3.B.1.2

1 Targets thyroid gland 8.3.B.1.2.1

3 Adrenocorticotropic Hormone (ACTH) 8.3.B.1.3

1 Targets adrenal cortex 8.3.B.1.3.1

2 Posterior Pituitary (neurohypophysis) 8.3.B.2

1 Antidiuretic Hormone (ADH) 8.3.B.2.1

1 Neural stimulus releases ADH to target kidneys for water retention 8.3.B.2.1.1

2 Oxytocin Hormone (Oxt) 8.3.B.2.2

1 Neural stimulus releases Oxt to target uterus for child birthing 8.3.B.2.2.1

2 Neural stimulus releases Oxt to target breast tissue for milk letdown 8.3.B.2.2.2

c Thyroid Gland-found inferior to the Larynx 8.3.C

1 Thyroxine (T4) 8.3.C.1

1 Targets cells increasing metabolism 8.3.C.1.1

2 Triiodothyronine (T3) 8.3.C.2

1 Targets cells increasing metabolism 8.3.C.2.1

d Adrenal Gland-found atop the kidneys 8.3.D

1 o Adrenal Cortex 8.3.D.1

1 Adrenocorticotropic Hormone (ACTH) 8.3.D.1.1

1 Stimulates the release of cortisol 8.3.D.1.1.1

2 Cortisol 8.3.D.1.2

1 Anti-inflammatory by suppressing white blood cells 8.3.D.1.2.1

2 Adrenal Medulla-sympathetic stimulus for sustained "Fight or Flight" 8.3.D.2

1 Epinephrine-adrenaline increasing cell metabolism 8.3.D.2.1

2 Norepinephrine-noradrenaline increasing cell metabolism 8.3.D.2.2

e Pancreas Gland-Exocrine/Endocrine gland in LUQ posterior to the stomach 8.3.E

1 Insulin 8.3.E.1

1 Released from Beta cells to target cells to decrease blood sugar 8.3.E.1.1

2 Glucagon 8.3.E.2

1 Released from Alpha cells to break down glycogen to increase blood sugar 8.3.E.2.1

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4 Identify the following diseases and disorders of the endocrine system. 8.4

a Dwarfism 8.4.A

b Gigantism 8.4.B

c Acromegaly 8.4.C

d Hypothyroidism 8.4.D

1 Myxedema 8.4.D.1

2 Cretinism-congenital hypothyroidism 8.4.D.2

e Hyperthyroidism (Graves' disease) 8.4.E

1 Goiter 8.4.E.1

2 Exophthalamos 8.4.E.2

f Diabetes mellitus 8.4.F

1 Type I 8.4.F.1

2 Type II 8.4.F.2

g Diabetes insipidus 8.4.G

h Cushing's syndrome 8.4.H

Blood-Students will describe the components and functions associated with blood. 9

1 Identify the components of blood and their functions. 9.1

a Erythrocytes 9.1.A

b Leukocytes 9.1.B

c Thrombocytes 9.1.C

d Plasma 9.1.D

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2 Describe erythrocytes, including the structure of hemoglobin. 9.2

3 **Define leukocyte and list the two major groups with their cell types and their function.** 9.3

- a Granulocytes 9.3.A
  - 1 Neutrophils 9.3.A.1
  - 2 Basophils 9.3.A.2
  - 3 Eosinophils 9.3.A.3
- b Agranulocytes 9.3.B
  - 1 Monocytes 9.3.B.1
  - 2 Lymphocytes 9.3.B.2

4 **Describe the process of hemostasis.** 9.4

- a Vascular spasm 9.4.A
- b Platelet plug formation 9.4.B
- c Coagulation 9.4.C

5 **Contrast a thrombus and an embolus.** 9.5

6 **Identify the antigens found on the erythrocytes and the antibodies that determine the ABO blood types and the Rh factor.** 9.6

7 **Identify the following diseases and disorders associated with the blood.** 9.7

- a Anemias 9.7.A
  - 1 Nutritional 9.7.A.1
  - 2 Pernicious 9.7.A.2
  - 3 Hemorrhagic 9.7.A.3
  - 4 Hemolytic 9.7.A.4
  - 5 Sickle cell 9.7.A.5
  - 6 Aplastic 9.7.A.6
  - 7 Hemolytic disease of the newborn 9.7.A.7
  - 8 Hemophilia 9.7.A.8
  - 9 Leukemia 9.7.A.9
  - 10 Mononucleosis 9.7.A.10
  - 11 Polycythemia 9.7.A.11

Lymphatic System- Students will describe the structures and functions of the lymphatic system. 10

1. **Identify the components of the lymphatic system.** 10.1
   - a Tonsils 10.1.A
   - b Spleen 10.1.B
   - c Thymus 10.1.C
   - d Lymph nodes 10.1.D
   - e Bone marrow 10.1.E
   - f Lymph vessels 10.1.F
2. **Describe how lymph is moved through the body.** 10.2
3. **Contrast antigens and antibodies.** 10.3
4. **Describe the general roles of T-cells and B-cells in the immune response.** 10.4
5. **Distinguish between active and passive immunity and natural vs. artificial acquisition of immunity.** 10.5
6. **Identify the following diseases and disorders associated with the lymphatic system.** 10.6
   - a AIDS 10.6.A
   - b Measles 10.6.B
   - c Mumps 10.6.C
   - d Rubella 10.6.D
   - e Tetanus 10.6.E

Performance Skills

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

Cardiovascular System- Students will describe the structures and functions of the cardiovascular system. 11

1. **List the general functions of the cardiovascular system.** 11.1
2. **Describe the layers of the heart.** 11.2
   - a Epicardium 11.2.A
   - b Myocardium 11.2.B
   - c Endocardium 11.2.C
3. **Identify the chambers of the heart.** 11.3
   - a Atria 11.3.A
   - b Ventricles 11.3.B

4 **Locate the great blood vessels of the heart.** 11.4

- a Superior vena cava 11.4.A
- b Inferior vena cava 11.4.B
- c Pulmonary trunk 11.4.C
- d Pulmonary arteries 11.4.D
- e Pulmonary veins 11.4.E
- f Aorta 11.4.F
- g Branches of the aorta 11.4.G

5 **Identify the valves of the heart.** 11.5

- a Tricuspid 11.5.A
- b Pulmonary semilunar 11.5.B
- c Bicuspid (mitral) 11.5.C
- d Aortic semilunar 11.5.D

6 **Trace blood flow through the heart.** 11.6

7 **Identify the components of the conduction system of the heart and trace the pathway.** 11.7

- a SA node 11.7.A
- b AV node 11.7.B
- c AV bundle 11.7.C
- d Bundle branches 11.7.D
- e Purkinje fibers 11.7.E

8 **Sequence the principle events of the cardiac cycle in terms of systole and diastole.** 11.8

9 **Define cardiac output and identify factors that influence it.** 11.9

- a Heart rate 11.9.A
- b Stroke volume 11.9.B

10 **Contrast the structures and functions of arteries, capillaries, and veins.** 11.10

11 **Define pulse and identify the general location of arteries where pulse may be felt.** 11.11

12 **Describe blood pressure and how to measure it.** 11.12

13 **Contrast pulmonary and systemic circulation.** 11.13

14 **Identify the following diseases and disorders of the cardiovascular system.** 11.14

- a Aneurysm 11.14.A
- b Arteriosclerosis 11.14.B
- c Atherosclerosis 11.14.C
- d Cerebrovascular accident/stroke 11.14.D
- e Coronary artery disease 11.14.E
- f Hypertension 11.14.F
- g Murmur 11.14.G
- h Myocardial infarction 11.14.H

Respiratory System- Students will describe the structures and functions associated with the respiratory system. 12

1 **Identify the general functions of the respiratory system.** 12.1

2 **Sequence the organs of the respiratory system in the order in which air will pass through them from the exterior.** 12.2

- a Nose/mouth 12.2.A
- b Pharynx 12.2.B
- c Larynx 12.2.C
- d Trachea 12.2.D
- e Bronchi 12.2.E
- f Bronchioles 12.2.F
- g Alveolar duct 12.2.G
- h Alveoli 12.2.H

3 **Identify the three regions of the pharynx.** 12.3

- a Nasopharynx 12.3.A
- b Oropharynx 12.3.B
- c Laryngopharynx 12.3.C

4 **Identify the following anatomical features of the larynx.** 12.4

- a Epiglottis 12.4.A
- b Glottis 12.4.B
- c Hyoid bone 12.4.C
- d Thyroid cartilage 12.4.D
- e Cricoid cartilage 12.4.E
- f True vocal cords 12.4.F
- g False vocal cords 12.4.G

5 **Identify the coverings of the lungs and the gross anatomical features of the lungs.** 12.5

- a Apex 12.5.A
- b Base 12.5.B
- c Lobes 12.5.C
- d Visceral pleura 12.5.D
- e Parietal pleura 12.5.E
- f Pleural cavity 12.5.F

6 **Identify the site at which gas exchange occurs in the lungs (alveoli).** 12.6

7 **Identify the volumes and capacities of air exchanged during ventilation.** 12.7

- a Tidal volume 12.7.A
- b Vital capacity 12.7.B

8 **Differentiate between the following.** 12.8

- a Ventilation 12.8.A
- b External respiration 12.8.B
- c Internal respiration 12.8.C

9 **Describe the effects of carbon dioxide on ventilation.** 12.9

10 **Identify the following diseases or disorders of the respiratory system.** 12.10

- a Chronic Obstructive Pulmonary Disorder 12.10.A
  - 1 Emphysema 12.10.A.1
- b Influenza 12.10.B
- c Lung cancer 12.10.C
- d Pneumonia 12.10.D
- e SIDS 12.10.E
- f Tuberculosis 12.10.F
- g Cystic Fibrosis 12.10.G
- h Respiratory Syncytial Virus (RSV) 12.10.H
- i Respiratory distress 12.10.I

Digestive System- Students will describe the structures and functions associated with the digestive system. 13

1 **Identify the general functions of the digestive system.** 13.1

2 **Contrast chemical and mechanical digestion.** 13.2

3 **Differentiate between the following.** 13.3

- a Alimentary canal structures 13.3.A
  - 1 Mouth 13.3.A.1
  - 2 Pharynx 13.3.A.2
  - 3 Esophagus 13.3.A.3
  - 4 Stomach 13.3.A.4
  - 5 Small intestines 13.3.A.5
  - 6 Large intestines 13.3.A.6
  - 7 Rectum 13.3.A.7
  - 8 Anus 13.3.A.8
- b Accessory structures 13.3.B
  - 1 Salivary glands (parotid) 13.3.B.1
  - 2 Pancreas 13.3.B.2
  - 3 Gallbladder 13.3.B.3
  - 4 Liver 13.3.B.4

4 **Describe the functions of saliva and salivary amylase in digestion.** 13.4

5 **Identify the following parts of a typical tooth.** 13.5

- a Crown 13.5.A
- b Neck 13.5.B
- c Root 13.5.C
- d Gingiva 13.5.D
- e Periodontal ligament 13.5.E
- f Enamel 13.5.F
- g Dentin 13.5.G
- h Pulp 13.5.H
- i Root canal 13.5.I

6 **Define the following.** 13.6

- a Deglutition 13.6.A
- b Mastication 13.6.B
- c Maceration 13.6.C
- d Segmentation 13.6.D
- e Peristalsis 13.6.E
- f Haustral churning 13.6.

7 **Identify the anatomical features of the stomach.** 13.7

- a Fundus 13.7.A
- b Body 13.7.B
- c Pylorus 13.7.C
- d Rugae 13.7.D
- e Cardiac sphincter 13.7.E
- f Pyloric sphincter 13.7.F

8 **Identify the basic components and functions of gastric juice.** 13.8

- a Chief cells 13.8.A
  - 1 Pepsinogen 13.8.A.1
- b Parietal cells 13.8.B
  - 1 Hydrochloric acid 13.8.B.1
- c Goblet cells 13.8.C
  - 1 Mucus 13.8.C.1

9 **Identify the location and digestive functions of the pancreas.** 13.9

- a Pancreatic Islets 13.9.A
- b Acini Cells 13.9.B

10 **Describe the function of bile (emulsification).** 13.10

11 **Identify the three sections of the small intestine and describe the functions.** 13.11

- a Duodenum 13.11.A
- b Jejunum 13.11.B
- c Ileum 13.11.C

12 **Identify the structures and sections of the large intestine and describe the functions.** 13.12

- a Cecum 13.12.A
- b Colon 13.12.B
  - 1 Ascending 13.12.B.1
  - 2 Transverse 13.12.B.2
  - 3 Descending 13.12.B.3
  - 4 Sigmoid 13.12.B.4
- c Rectum 13.12.C
- d Anal canal 13.12.D

13 **Identify the following diseases and disorders of the digestive system.** 13.13

- a Appendicitis 13.13.A
- b Cirrhosis 13.13.B
- c Colorectal cancer 13.13.C
- d Gallstones 13.13.D
- e Hepatitis 13.13.E
- f Obesity 13.13.F
- g Ulcers 13.13.G
- h Celiac disease 13.13.H
- i Crohn's disease 13.13.I
- j Irritable Bowel Syndrome (IBS) 13.13.J

Urinary System- Students will describe the structures and functions associated with the urinary system. 14

1 **Identify the general functions of the urinary system.** 14.1

2 **Identify the four major organs of the urinary system.** 14.2

- a Kidneys 14.2.A
- b Ureters 14.2.B
- c Bladder 14.2.C
- d Urethra 14.2.D

3 **Identify the gross anatomy of the kidney** 14.3

- a Renal cortex 14.3.A
- b Renal medulla 14.3.B
- c Renal pyramids 14.3.C
- d Renal pelvis 14.3.D
- e Renal capsule 14.3.E
- f Calyces 14.3.F

4 **Identify the microscopic structures of the nephron.** 14.4

- a Renal corpuscle 14.4.A
- b Glomerulus 14.4.B
- c Glomerular (Bowman's) capsule 14.4.C
- d Afferent arteriole 14.4.D
- e Efferent arteriole 14.4.E
- f Renal tubule 14.4.F
  - 1 Proximal convoluted tubule 14.4.F.1
  - 2 Descending limb 14.4.F.2
  - 3 Nephron loop 14.4.F.3
  - 4 Ascending limb 14.4.F.4
  - 5 Distal convoluted tubule 14.4.F.5
  - 6 Collecting duct 14.4.F.6
- g Peritubular capillaries 14.4.G

5 **Describe the three basic physiological processes and the structures involved in urine formation.** 14.5

- a Filtration 14.5.A
- b Reabsorption 14.5.B
- c Secretion 14.5.C

6 **Identify abnormal constituents of urine and possible causes of each.** 14.6

- a Glucose 14.6.A
- b Ketones 14.6.B
- c Erythrocytes 14.6.C
- d Leukocytes 14.6.D
- e Bilirubin 14.6.E
- f Microbes 14.6.F
- g Albumin 14.6.G

7 **Describe the methods of fluid intake and output.** 14.7

- a Intake 14.7.A
  - 1 Oral 14.7.A.1
    - 1 Liquid 14.7.A.1.1
    - 2 Solid 14.7.A.1.2
  - 2 Intravenous 14.7.A.2
  - 3 Metabolic 14.7.A.
- b Output 14.7.B
  - 1 Micturition 14.7.B.1
  - 2 Voiding 14.7.B.2
  - 3 Sweat 14.7.B.3
  - 4 Feces 14.7.B.4
  - 5 Exhaled vapor 14.7.B.5

8 **Identify the following diseases and disorders associated with the urinary system.** 14.8

- a Cystitis 14.8.A
- b Glomerulonephritis 14.8.B
- c Incontinence 14.8.C
- d Kidney stones 14.8.D
- e Polyuria 14.8.E
- f Renal failure 14.8.F
- g Urinary tract infections (UTI) 14.8.G

Reproductive System- Students will describe the structures and functions associated with the reproductive system. 15

1 **Identify the general functions of the reproductive system.** 15.1

2 **Describe the anatomy of the male genitalia.** 15.2

- a External 15.2.A
  - 1 Penis 15.2.A.1
  - 2 Scrotum 15.2.A.2
  - 3 Testes 15.2.A.3
- b Internal 15.2.B
  - 1 Epididymis 15.2.B.1
  - 2 Ductus deferens 15.2.B.2
  - 3 Ejaculatory duct 15.2.B.3
  - 4 Urethra 15.2.B.4
- c Accessory 15.2.C
  - 1 Seminal vesicles 15.2.C.1
  - 2 Prostate 15.2.C.2
  - 3 Bulbourethral gland 15.2.C.3

3 **Identify the function of the testes.** 15.3

4 **Identify the functions of testosterone in the male.** 15.4

5 **Describe the anatomy of the female reproductive structures.** 15.5

- a External 15.5.A
  - 1 Vulva 15.5.A.1
  - 2 Labia majora 15.5.A.2
  - 3 Clitoris 15.5.A.3
  - 4 Labia minora 15.5.A.4
  - 5 Mons pubis 15.5.A.5
  - 6 Vestibule 15.5.A.6
- b Internal 15.5.B
  - 1 Ovaries 15.5.B.1
  - 2 Uterus 15.5.B.2
  - 3 Uterine tubes 15.5.B.3
  - 4 Vagina 15.5.B.4
- c Accessory 15.5.C
  - 1 Mammary glands 15.5.C.1
  - 2 Perineum 15.5.C.2

6 **Identify the functions of the ovaries.** 15.6

7 **Identify the structures and functions of the uterine tubes, including fimbriae and infundibulum.** 15.7

8 **Describe the structures and function of the uterus.** 15.8

- a Perimetrium 15.8.A
- b Myometrium 15.8.B
- c Endometrium 15.8.C
  - 1 Stratum functionalis 15.8.C.1
  - 2 Stratum basalis 15.8.C.2
- d Fundus 15.8.D
- e Cervix 15.8.E

9 **Define the menstrual cycle including the ovarian and uterine cycles and changes that occur during menopause.** 15.9

10 **Describe the physiological effects of estrogens, progesterone and relaxin.** 15.10

11 **Contrast the general outcomes of spermatogenesis vs. oogenesis** 15.11

12 **Define the following sequence of events that occur during human development.** 15.12

- a Fertilization 15.12.A
- b Zygote 15.12.B
- c Implantation 15.12.C
- d Embryo 15.12.D
- e Fetus 15.12.E

13 **Identify the principle events associated with the three stages of labor.** 15.13

- a Stage 1-dilation and effacement 15.13.A
- b Stage 2-delivery and birth 15.13.B
- c Stage 3-placental expulsion 15.13.C

14 **Identify the following diseases and disorders of the reproductive system.** 15.14

- a Reproductive cancers 15.14.A
  - 1 Breast 15.14.A.1
  - 2 Testicular 15.14.A.2
  - 3 Cervical 15.14.A.3
  - 4 Ovarian 15.14.A.4
  - 5 Prostate 15.14.A.5
  - 6 Uterine 15.14.A.6
- b Endometriosis 15.14.B
- c Impotence 15.14.C
- d Polycystic Ovarian Syndrome 15.14.D
- e Sexually Transmitted Infections (STI) 15.14.E
  - 1 Gonorrhea 15.14.E.1
  - 2 Syphilis 15.14.E.2
  - 3 Genital herpes 15.14.E.3
  - 4 Chlamydia 15.14.E.4
  - 5 Trichimoniasis 15.14.E.5
  - 6 Genital warts 15.14.E.6
  - 7 Human Papilloma Virus (HPV) 15.14.E.7