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

Transverse (horizontal) 1.5.C

Frontal (coronal) 1.5.D

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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

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- 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

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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

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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.

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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.

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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

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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

Subcutaneous (hypodermis) 4.5.C

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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

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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

- a Long 5.4.A
- b Short 5.4.B
- 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
- Hyoid 5.8.I
- Temporal 5.8.J

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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

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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

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xplain 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

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- 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

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- 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

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- 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

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- 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

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- 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

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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

EN Skip to main content **dentify the general functions of the endocrine system.** 8.1

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the structures and

functions associated with the endocrine system. 8

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

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- 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 fu wi

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1 Identify the components of blood and their functions. 9.1

- a Erythrocytes 9.1.A
- Leukocytes 9.1.B
- Thrombocytes 9.1.C

- d Plasma 9.1.D

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

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dentify the components of the lymphatic system. 10.1

- a Tonsils 10.1.A

the structures and functions of the lymphatic system. 10

- 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

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- 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

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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

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- 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

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- 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.

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dentify 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

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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

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- 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

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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

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- 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

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- 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