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| Central florida assessment collaborative |
| Individual Test Item Specifications |
| Anatomy & Physiology |
| 2014 |

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Table of Contents

[I. Guide to the Individual Benchmark Specifications 1](#_Toc362246932)

[Benchmark Classification System 1](#_Toc362246933)

[Definitions of Benchmark Specifications 3](#_Toc362246934)

[II. Individual Benchmark Specifications 4](#_Toc362246935)

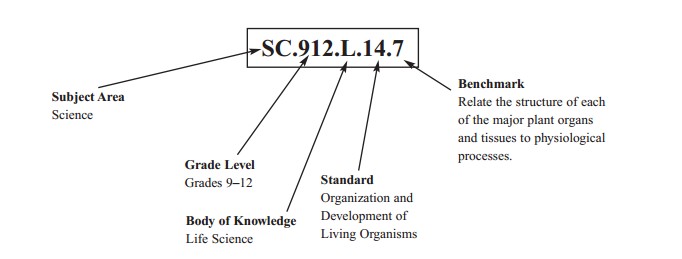
I. Guide to the Individual Benchmark Specifications

Content specific guidelines are given in the *Individual Benchmark Specifications* for each course. The *Specifications* contains specific information about the alignment of items with the NGSSS and Florida Standards. It identifies the manner in which each benchmark is assessed, provides content limits and stimulus attributes for each benchmark, and gives specific information about content, item types, and response attributes.

## Benchmark Classification System

Each NGSSS benchmark is labeled with a system of letters and numbers.

* The two letters in the *first position* of the label identify the **Subject Area**.
* The number(s) in the *second position* represents the **Grade Level**.
* The letter in the *third position* represents the **Strand** or **Body of Knowledge.**
* The number in the *fourth position* represents the **Standard**.
* The number in the *last position* identifies the specific **Benchmark**.



Each MAFS benchmark is labeled with a system of letters and numbers.

* The four letters in the *first position* of the label identify the **Subject**.
* The number(s) in the *second position* represents the **Grade Level**.
* The letter(s) in the *third position* represents the **Category**.
* The number in the *fourth position* shows the **Domain**.
* The number in the *fifth position* identifies the **Cluster**.
* The number in the *last position* identifies the specific **Benchmark**.



## Definitions of Benchmark Specifications

The *Individual Benchmark Specifications* provides standard-specific guidance for assessment item development for CFAC item banks. For each benchmark assessed, the following information is provided:

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| **Reporting Category** | is a grouping of related benchmarks that can be used to summarize and report achievement. |
| **Standard** | refers to the standard statement presented in the NGSSS or domain in the Florida Standards. |
| **Benchmark** | refers to the benchmark statement presented in the NGSSS or standard statement in the Florida Standards. In some cases, two or more related benchmarks are grouped together because the assessment of one benchmark addresses another benchmark. Such groupings are indicated in the Also Assesses statement. |
| **Item Types**  **Cognitive Complexity** | are used to assess the benchmark or group of benchmark.  ideal complexity level at which the item should be assessed. |
| **Benchmark Clarifications** | explain how achievement of the benchmark will be demonstrated by students. In other words, the clarification statements explain what the student will do when responding to questions. |
| **Content Limits** | define the range of content knowledge and that should be assessed in the items for the benchmark. |
| **Stimulus Attributes** | define the types of stimulus materials that should be used in the items, including the appropriate use of graphic materials and item context or content. |
| **Response Attributes**  **Content Focus** | define the characteristics of the answers that a student must choose or provide.  defines the content measured by each test item. Content focus addresses the broad content and skills associated with the examples found in the standards, benchmarks, or benchmark clarifications |
| **Sample Items** | are provided for each type of question assessed. The correct answer for all sample items is provided. |

# II. Individual Benchmark Specifications

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.6  Explain the significance of genetic factors, environmental factors, and  pathogenic agents to health from the perspectives of both individual and public health. |
| **Also Assesses** | SC.912.L.14.52 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low, Moderate, High |
| **Benchmark**  **Clarification** | Students will be able to identify/explain how individual health and public health or the health is influenced by a variety of factors.  Students will be able to identify/explain how faulty genes can cause diseases and disorders affecting human health.  Students will be able to identify/ explain that genetic diseases or disorders can sometimes be predicted by genetic testing and how this can contribute to individual and public health decisions.  Students will be able to identify how bacteria, viruses, and other infectious agents can cause disease.  Students will be able to explain how the body produces antibodies to fight disease and how vaccines assist this process.  Students will be able to identify/explain how environmental factors such as chemicals, pollutants, sun exposures and others can contribute to human health. |
| **Content Limits** | Items should be limited to how these factors affect specific organ systems. |
| **Stimulus Attributes** | Item may include diagrams. |
| **Response Attributes** | Not Applicable |

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| **Content Focus** | allergy, pathogenic, nonpathogenic, genes, infectious agents, virus, vaccine, immunity, cancer |
| **Sample Item** | Nonpathogenic agents such as peanuts and pollen are capable of causing the immune system to respond. Which of the following is an example of this kind of immune response?  A) allergic  B) antiseptic  C) innate  D) lymphatic  Correct Answer: A |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.11  Classify and state the defining characteristics of epithelial tissue, connective tissue, muscle tissue, and nervous tissue. |
| **Also Assesses** | SC.912.L.14.2; SC.912.L.14.12; SC.912.L.14.16; SC.912.L.14.40;  SC.912.L.14.43; SC.912.L.14.43; SC.912.L.14.45 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate, High |
| **Benchmark**  **Clarification** | Students will be able to identify the different tissue types.  Students will be able to explain the general functions of each of the different tissue types.  Students will be able to classify the different tissue types based on given functions.  HONORS: Students will be able to determine what type of epithelial tissues might be found in different organs (structure related to function).  Students will be able to determine where different tissue types may be found on specific organs based on their functions. |
| **Content Limits** | Epithelial tissue classification may include types of epithelial cells (squamous, cuboidal, or columnar) and structure (simple or stratified).  Epithelial connections may be included as characteristics related to epithelial function.  Identification of Connective tissues may include characteristics (specialized cells in specific matrix).  Muscle tissue may include general distinctions between skeletal, smooth and cardiac muscle.  Questions relating to connective tissue may include the ground substance consistency - from solid (bone), liquid (blood connective tissue), to gel-like ground substance (as in cartilage), and may also discuss the fiber type present (collagen, reticular, and elastic.) |
| **Stimulus Attributes** | Item may contain diagrams/pictures of tissues. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | simple squamous epithelium, simple cuboidal epithelium, simple columnar epithelium, stratified squamous epithelium, stratified cuboidal epithelium, stratified columnar epithelium, transitional epithelium, glandular epithelium, skeletal muscle, smooth muscle, cardiac muscle, bone tissue, hyaline cartilage, fibrocartilage, elastic cartilage, dense connective tissue, loose connective tissue, areolar tissue, adipose tissue, reticular connective tissue, blood, neurons, nerve supporting cells |
| **Sample Item** | Which tissue type performs peristalsis in the digestive system?  A) cardiac muscle  B) fluid connective  C) smooth muscle  D) squamous epithelium  Correct Answer: C |

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| **Reporting Category** | Organisms and Populations |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.12  Describe the anatomy and histology of bone tissue. |
| **Also Assesses** | N/A |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low, Moderate |
| **Benchmark**  **Clarification** | Students will differentiate the structure of compact bone and spongy bone. The main focus will be the basic unit of structure for an osteon for compact bone and trabeculae for spongy bone. |
| **Content Limits** | Items should assess the differences between structure and tissue make up of bone tissue.  Bone marrow storage may also be discussed, as it is one of the functions of each bone tissue type. For example: Red bone marrow is stored in the spaces of trabeculae while yellow bone marrow is stored in the medullary cavity of compact bone tissue. (Functions may be up for discussion as the benchmark asks for anatomy (structure), however, when discussing histology; all the tissue types may be discussed including bone marrow. |
| **Stimulus Attributes** | Diagrams may be used to view and compare the "tree-like" rings of an osteon's structure or the latticework structure of the trabeculae of spongy bone. |
| **Response Attributes** | None Specified |
| **Content Focus** | canaliculi, central (Haversian) canals, compact bone, Haversian system (osteon), lacunae, lamellae, medullary cavity (yellow marrow), osteocytes, osteoblasts, osteoclasts, perforating (Volkmann’s) canals, red marrow, spongy bone, trabeculae |

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| **Sample Item** | Which of the following is a basic unit of compact bone?  A) canaliculi  B) osteocyte  C) osteon  D) trabeculae  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.13  Distinguish between bones of the axial skeleton and the appendicular skeleton. |
| **Also Assesses** | SC.912.L.14.14 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low, Moderate |
| **Benchmark**  **Clarification** | Students will distinguish between the bones of the axial skeleton and the  appendicular skeleton. Students will identify the major bones of the axial and the appendicular skeleton. |
| **Content Limits** | Items will assess the bones of human anatomy and will not assess the bones of other vertebrates.  Items will not include joints or deformations of the skeletal system.  Items will not assess bone fractures.  Items will not assess the functions of the major bones. |
| **Stimulus Attributes** | Illustrations or diagrams may be used. |
| **Response Attributes** | None Specified |
| **Content Focus** | axial, appendicular, skull, vertebrae, sacrum, coccyx, sternum, ribs, clavicle, scapula, humerus, radius, ulna, carpals, metacarpals, phalanges, coxal bones, femur, tibia, fibula, tarsals, me tarsals, patella |
| **Sample Item** | Which bones are associated with the axial skeleton?  A) femur, patella, and tibia  B) humerus, radius, and ulna  C) skull, ribs, vertebra  D) tarsals, metatarsals, and phalanges  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.14  Identify the major bones of the axial and appendicular skeleton. |
| **Also Assesses** | SC.912.L.14.13 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low, Moderate |
| **Benchmark**  **Clarification** | Students will identify the major bones of the axial and appendicular skeleton.  Students will distinguish between the bones of the axial skeleton and the appendicular skeleton. |
| **Content Limits** | Items will not assess the function of the major bones of the axial and  appendicular skeleton.  Items will assess the bones of human anatomy, and will not include the bones of other vertebrates.  Items will only assess the major bones (i.e. skull, ribs, sternum, sacrum, vertebra, clavicle, scapula, humerus, radius, ulna, femur, patella, tibia, fibula, carpals, tarsals, phalanges) and will not include the minor bones.  Items will not include joints or deformations of the skeletal system.  Items will not assess bone fractures.  Items will not assess the functions of the major bones. |
| **Stimulus Attributes** | Illustrations or diagrams may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | axial, appendicular, skull, vertebrae, sacrum, coccyx, sternum, ribs, clavicle, scapula, humerus, radius, ulna, carpals, metacarpals, phalanges, coxal bones, femur, tibia, fibula, tarsals, metatarsals, patella |
| **Sample Item** | Which bone is associated with the forearm?  A) humerus  B) metacarpals  C) tibia  D) ulna  Correct Answer: D |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.15- Anatomy & Physiology Honors ONLY  Identify major markings (such as foramina, fossae, tubercles, etc.)  on a skeleton. Explain why these markings are important. |
| **Also Assesses** | Not Applicable |
| **Item Types** | Selected Response, Short Response |
| **Cognitive Complexity** | Moderate |
| **Benchmark**  **Clarification** | Students will explain why major markings on the skeleton are important, such as foramen allowing blood vessels and nerves to pass, projections allowing for muscle attachment, and various shapes allowing for articulation such as condyles fitting into fossae. |
| **Content Limits** | Items are limited to skeleton markings.  Items will assess markings on human bones, and will not assess markings on bones of other vertebrates.  Items will not assess bone fractures.  Items will not assess the functions of the skeletal system. |
| **Stimulus Attributes** | Illustrations or diagrams may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | tuberosity, crest, trochanter, line, tubercle, epicondyle, spine, process, head, facet, foramen, condyles, fossa, ramus, groove, fissure, notch, meatus, sinus |
| **Sample Item** | Which bone marking is a sharp, slender, and pointed projection?  A) crest  B) facet  C) sinus  D) spine  Correct Answer: D |

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| **Reporting Category** | Molecular & Cellular Biology |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.17  List the steps involved in the sliding filament of muscle contraction. |
| **Also Assesses** | SC.912.14.16 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate, High |
| **Benchmark**  **Clarification** | Student will be able to list, in order, the steps, (Honors: including relevant molecules involved in those steps), of the sliding filament theory from nerve impulse to sarcomere shortening. |
| **Content Limits** | This item is limited to steps between the release of acetylcholine into the  neuromuscular junction through interactions between myosin and actin. |
| **Stimulus Attributes** | This standard may include diagrams (sarcomere). |
| **Response Attributes** | Not Applicable |
| **Content Focus** | acetylcholine, actin, myosin, thin filaments, thick filaments, sarcomere, A band, Z disc, M line, I bands, H zones, cross bridges, neuromuscular junction, synaptic cleft, synaptic vesicles, neurotransmitter |
| **Sample Item** | What major proteins are involved in the sliding filament theory of muscle contraction?  A) actin and myosin  B) collagen and actin  C) collagen and elastin  D) myosin and elastin  Correct Answer: A |

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| **Reporting Category** | Molecular & Cellular Biology |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.18  Describe signal transmission across a myoneural junction. |
| **Also Assesses** | SC.912.L.14.2 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate, High |
| **Benchmark**  **Clarification** | Students will demonstrate understanding of the molecular interactions in the neuromuscular junction between pre and postsynaptic cells.  Students should also be able to demonstrate an understanding of how other molecules (drugs of abuse) may interfere with these interactions. |
| **Content Limits** | This standard should not assess the physiology of a nerve impulse beyond the release of neurotransmitters into the myoneural synapse. |
| **Stimulus Attributes** | Diagrams may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | acetylcholine, neuromuscular junction, synaptic cleft, synaptic vesicles, neurotransmitter, pre synaptic, post synaptic, axon |
| **Sample Item** | Which neurotransmitter is involved in initiating muscle contraction at the neuromuscular junction?  A) acetylcholine  B) dopamine  C) epinephrine  D) serotonin  Correct Answer: A |

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| **Reporting Category** | Molecular & Cellular Biology |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.19- Anatomy & Physiology Honors ONLY  Explain the physiology of skeletal muscle. |
| **Also Assesses** | SC.912.L.18.4; SC.912.L.18.6; SC.912.L.18.8; SC.9112.L.14.16; SC.912.L.14.17 |
| **Item Types** | Selected Response; Short Answer |
| **Cognitive Complexity** | Moderate |
| **Benchmark**  **Clarification** | Students will explain the interactions between all structures and chemicals involved in the sliding filament theory. |
| **Content Limits** | Items are limited to skeletal muscle contraction. |
| **Stimulus Attributes** | Illustrations or diagrams may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | acetylcholine, actin, myosin, thin filaments, thick filaments, sarcomere, A band, Z disc, M line, I bands, H zones, cross bridges, neuromuscular junction, synaptic cleft, synaptic vesicles, neurotransmitter, troponin, tropomyosin |
| **Sample Item** | Which chemical interacts with the troponin/tropomyosin complex to expose the attachment site of actin allowing cross-bridge formation?  A) Ca+2  B) K+  C) Mg+2  D) Na+  Correct Answer: A |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.20  Identify the major muscles of the human on a model or diagram. |
| **Also Assesses** | Not Applicable |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low, Moderate |
| **Benchmark**  **Clarification** | Given a diagram/picture, students will be able to identify the major muscles. |
| **Content Limits** | Limited to the major muscles of the human body. Examples of the MAJOR muscles are ones grouped by size such as Pectoralis major or action (primary mover) such as Rectus femoris is the major muscle responsible for extension of the leg at the knee joint. |
| **Stimulus Attributes** | Diagrams may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | Masseter, Sternocleidomastoid, Trapezius, Pectoralis major, Deltoid, Biceps brachii, Triceps brachii, Brachioradialis, Gluteus maximus, Rectus femoris, Vastus medialis, Vastus lateralis, Vastus intermedius, Biceps femoris, Sartorius, Gastrocnemius, Soleus, Tibialis anterior, Rectus abdominis, External oblique, Serratus anterior, Latissimus dorsi, Orbicularis oris, Orbicularis oculi |
| **Sample Item** | Identification of major muscles on an unlabeled diagram such as the following would be the preferred type of item for this benchmark.  Description: http://wc1.smartdraw.com/examples/content/Examples/10_Education/1_Anatomy/Posterior_Muscles_Unlabeled_L.jpg  In order to raise the right arm laterally, what would be the primary muscle contracting?     1. deltoid 2. latissimus 3. trapezius 4. triceps brachii   Correct Answer: A |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.21  Describe the anatomy, histology, and physiology of the central and peripheral nervous systems, and name the major divisions of the nervous system. |
| **Also Assesses** | SC.912.L.14.23; SC.912.L.14.25; SC.912.L14.26 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate, High |
| **Benchmark**  **Clarification** | Students will name the major divisions of the nervous system based on structural classification (central and peripheral) and functional classification (somatic and autonomic).  Students will describe the anatomy, histology, and physiology of the brain, spinal cord, and peripheral nerves.  Students will describe the anatomy, histology, and physiology of the autonomic division, which controls involuntary organs and bodily functions.  Students will describe the anatomy, histology and physiology of the somatic division of the nervous system, which consists of peripheral nerve fibers that send sensory information to the central nervous system and motor nerve fibers that project to skeletal muscle. |
| **Content Limits** | Items will be limited to assessing the anatomy, histology, and physiology of the central and peripheral nervous systems.  Items will be limited to assessing the major divisions of the nervous system, which includes the structural classification (central and peripheral) and the functional classification (somatic and autonomic).  Items will not assess defects in the nervous system. |
| **Stimulus Attributes** | None Specified |
| **Response Attributes** | Not Applicable |
| **Content Focus** | central nervous system, brain, spinal cord, peripheral nervous system, somatic (voluntary) nervous system, autonomic (involuntary) nervous system, nerves, ganglia, sensory (afferent) division, motor (efferent) division, cerebrum, cerebral hemispheres, cerebellum, brain stem, diencephalon |
| **Sample Item** | Which major region of the brain is responsible for speech, memory, emotional response, and consciousness?  A) brain stem  B) cerebellum  C) cerebral hemispheres  D) diencephalon  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.22- Anatomy & Physiology HONORS ONLY  Describe the physiology of nerve conduction, including the generator potential, action potential, and the synapse. |
| **Also Assesses** | SC.912.L.14.2 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate |
| **Benchmark Clarification** | Students will relate structure to function for the components of plant and animal cells.  Students will explain the role of cell membranes as a highly selective barrier. |
| **Content Limits** | Items will assess the physiology of nerve conduction.  Items will not assess the anatomy of nerve conduction.  Items will not assess the types of cells in nervous tissue.  Items will not assess the structure of a typical motor neuron.  Items will not assess the classification of neurons. |
| **Stimulus Attributes** | None Specified |
| **Response Attributes** | Not Applicable |
| **Content Focus** | generator potential, action potential, nerve impulse, acetylcholine, neuromuscular junction, synaptic cleft, synaptic vesicles, neurotransmitter, plasma membrane |
| **Sample Item** | What happens to the properties of the cell’s plasma membrane when a neuron is adequately stimulated?  A) It changes and closes the “gates” of the sodium channels.  B) It does not change and closes the “gates” of the sodium channels.  C) It changes and allows the “gates” of the sodium channels to open.  D) It does not change and allows the “gates” of sodium channels to open.  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.24  Identify the general parts of a synapse and describe the physiology of signal transmission across a synapse. |
| **Also Assesses** | SC.912.L.14.2 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate, High |
| **Benchmark**  **Clarification** | Students will relate structure to function for the components of plant and animal cells.  Students will explain the role of cell membranes as a highly selective barrier. |
| **Content Limits** | Items will assess the vesicles and synaptic cleft. Items will assess how  the transmission of an impulse is carried across a synapse. |
| **Stimulus Attributes** | Illustrations or diagrams may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | action potential, axon terminal, nerve impulse, acetylcholine, neuromuscular junction, synaptic cleft, synaptic vesicles, neurotransmitter |
| **Sample Item** | Which of the following parts of a synapse are correctly matched with their function/structure?  A) The synaptic cleft stores the neurotransmitter.  B) The synaptic cleft separates the axon terminal from the adjacent cell.  C) The axon terminal receives the stimulus from the dendrite of the  adjacent cell.  D) The axon terminal contains the enzymes that break down the  neurotransmitters.  Correct Answer: B |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.27- Anatomy & Physiology Honors ONLY  Identify the functions of the major parts of the brain, including the meninges, medulla, pons, midbrain, hypothalamus, thalamus, cerebellum, and cerebrum. |
| **Also Assesses** | SC.912.L.14.31 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low |
| **Benchmark**  **Clarification** | Students will identify the functions of the major parts of the brain. |
| **Content Limits** | Items are limited to the meninges, medulla, pons, midbrain, hypothalamus, thalamus, cerebellum, and cerebrum.  Items will not assess the identification of the major parts of the brain.  Items will assess the functions of the meninges, medulla, pons, midbrain, hypothalamus, thalamus, cerebellum, and cerebrum.  Items will not assess the anatomy or physiology of the brain.  Items will not assess brain dysfunctions.  Items will not assess brain development. |
| **Stimulus Attributes** | Illustrations or diagrams may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | meninges, medulla, pons, midbrain, hypothalamus, thalamus, cerebellum, and cerebrum |
| **Sample Item** | Which part of the brain is responsible for the regulation of body temperature, water balance, and metabolism?  A) cerebellum  B) hypothalamus  C) medulla  D) thalamus  Correct Answer: B |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.30  Compare endocrine and neural controls of physiology. |
| **Also Assesses** | SC.912.L.14.31 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate |
| **Benchmark**  **Clarification** | Students will compare the differences between cell to cell communication via the synapse and long distance communication via hormones released into the circulatory and lymphatic systems. |
| **Content Limits** | This item will not assess cell communication via the details of signal transduction.  This item will not include paracrine or cell-to-cell (gap junction) methods of cell communication.  This item may address feedback control mechanisms. |
| **Stimulus Attributes** | None Specified |
| **Response Attributes** | None Specified |
| **Content Focus** | hormones, target organs, neurotransmitters, negative feedback |
| **Sample Item** | Which of the following are differences between neural and endocrine methods of cell communication?  A) Hormones and neurotransmitters are released into the synapse.  B) Neurotransmitters and hormones are released into the circulatory  system.  C) Hormones are released by endocrine glands and neurotransmitters  are released by neurons.  D) Hormones are released by neurons and neurotransmitters are  released by endocrine glands.  Correct Answer: C |

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| **Reporting Category** | Organisms and Populations |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.31 Anatomy and Physiology Honors ONLY  Describe the physiology of hormones including the different types and the mechanisms of their action. |
| **Also Assesses** | SC.912.L.14.2; SC.912.L.14.36 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low |
| **Benchmark**  **Clarification** | Students will describe the functions/role of each hormone its effect on the organ/organ system/ or body as a whole. |
| **Content Limits** | May include the role in communication a hormone may play in feedback  systems. |
| **Stimulus Attributes** | Graphics may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | growth hormone, prolactin, adrenocorticotropic hormone, thyroid stimulating hormone, follicle-stimulating hormone, luteinizing hormone, oxytocin, antidiuretic hormone, thryoxine, triiodothyronine, calcitonin, parathyroid hormone, aldosterone, cortisone, cortisol, androgens, estrogens, epinephrine, norepinephrine, insulin, glucagon, melatonin, thymosin, progesterone, testosterone, human chorionic gonadotropin, human placental lactogen, relaxin |
| **Sample Item** | Which of the following stimulates the release of PTH from the  parathyroid gland?   1. TSH from the posterior pituitary. 2. Low levels of glucose in the blood. 3. Low levels of calcium in the blood. 4. Calcitonin from the anterior pituitary.   Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.32  Describe the anatomy and physiology of the endocrine system. |
| **Also Assesses** | SC.912.L.14.29 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate |
| **Benchmark**  **Clarification** | Students will identify the major glands of the endocrine system, the hormones they release and the function of those hormones. |
| **Content Limits** | This item is limited to the most common endocrine glands and their hormones. |
| **Stimulus Attributes** | May include diagrams |
| **Response Attributes** | Not Applicable |
| **Content Focus** | pituitary gland, thyroid gland, parathyroid glands, adrenal glands, pancreas, pineal gland, thymus gland, gonads, hypothalamus, ovary, testis, growth hormone, thyroid stimulating hormone, follicle-stimulating hormone, luteinizing hormone, oxytocin, antidiuretic hormone, aldosterone, estrogens, epinephrine, norepinephrine, insulin, glucagon, progesterone, testosterone |
| **Sample Item** | How does the endocrine system regulate blood glucose levels?  A) The pancreas releases glucagon to lower blood glucose levels and  releases insulin to elevate blood glucose levels.  B) The liver releases glucagon to lower blood glucose levels and  releases insulin to elevate blood glucose levels.  C) The pancreas releases insulin to lower blood glucose levels and  releases glucagon to increase blood glucose levels.  D) The liver releases insulin to lower blood glucose levels and  releases glucagon to increase blood glucose levels.  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.33  Describe the basic anatomy and physiology of the reproductive system  . |
| **Also Assesses** | SC.912.L.14.29; SC.912.L.16.13 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate |
| **Benchmark**  **Clarification** | Students will identify the major organs of the male and female reproductive systems.    Students will describe the development of the male and female reproductive systems.  Students will describe the mechanisms (hormonal) of control of the male and female reproductive systems.  Students will describe human development from fertilization through adulthood.  Students will explain the changes that occur during pregnancy (each trimester) for the developing embryo/fetus and the mother.  Students will explain the process of parturition. |
| **Content Limits** | None Specified |
| **Stimulus Attributes** | May include diagrams. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | testes, sperm, semen, seminal vesicles, prostate gland, epididymis, ductus deferens, bulbourethral gland, urethra, scrotum, penis, testosterone, ovaries, uterus, cervix, vagina, oogenesis, menstrual cycle, mammary glands, fallopian tubes, fertilization, embryo, fetus, trimester, zygote, estrogen, testosterone, follicle-stimulating hormone, luteinizing hormone, follicles, corpus luteum, cleavage, placenta, puberty, menopause |
| **Sample Item** | Which of the following hormones might be used by a fertility clinic to help to enhance female fertility?  A) estrogen  B) FSH  C) oxytocin  D) testosterone  Correct Answer: B |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.34  Describe the composition and physiology of blood, including that of the  plasma and the formed elements. |
| **Also Assesses** | SC.912.L.14.35 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate, High |
| **Benchmark**  **Clarification** | Students will be able to identify the relative composition of blood (plasma vs. formed elements).  Students will be able to identify the major plasma proteins (Honors: and their general functions).  Students will be able to identify the formed elements in blood (Honors: and describe the functions of each). |
| **Content Limits** | This item does not assess the steps or molecules involved in coagulation. |
| **Stimulus Attributes** | May include diagram. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | plasma, erythrocytes, leukocytes, platelets, buffy coat, formed elements |
| **Sample Item** | Which of the following is the correct order of blood components from most abundant to least abundant?  A) erythrocytes, leukocytes, plasma  B) leukocytes, erythrocytes, plasma  C) leukocytes, plasma, erythrocytes  D) plasma, erythrocytes, leukocytes  Correct Answer: D |

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| **Reporting Category** | Molecular & Cellular Biology |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.35  Describe the steps in hemostasis, including the mechanism of coagulation. Include the basis for blood typing and transfusion reactions. |
| **Also Assesses** | SC.912.L.18.4 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate, High |
| **Benchmark**  **Clarification** | Students will be able to describe the heritable factors that determine ABO and Rh blood types (relevant RBC antigens).  Students will be able to describe the relevant plasma proteins (antibodies) related to ABO blood typing and the significance in transfusion reactions.  Students will describe the significance of Rh antigens and the formation of Rh antibodies as related to transfusion and pregnancy.  Students will describe the role of coagulation, including the role of platelets, as an immediate response to injury. |
| **Content Limits** | Coagulation is limited to vascular responses and platelet response as a function of immediate injury response/repair. |
| **Stimulus Attributes** | May contain graphics, charts, and data tables. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | platelet plug, coagulation, hemostasis, clotting factors, vascular spasm, transfusion, Rh factor, Rh blood groups, ABO blood groups, antibodies (agglutinins), antigens (agglutinogens), hemolytic disease of the newborn (erythroblastosis fetalis) |
| **Sample Item** | Which of the following combinations of red blood cell antigens may be responsible for hemolytic disease of the newborn?    A) A- mother and A- fetus  B) A+ mother and A + fetus  C) Rh- mother and Rh+ fetus  D) Rh+ mother and Rh- fetus  Correct Answer: C |

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| **Reporting Category** | Molecules and Cells |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.36  Describe the factors affecting blood flow through the cardiovascular system. |
| **Also Assesses** | SC.912.L.14.31; SC.912.L.14.40; SC.912.L.14.39 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate, High |
| **Benchmark**  **Clarification** | Students will be able to describe those factors causing vasoconstriction,  vasodilation, increased blood volume and reduced vascular volume. This may include temperature regulation, causes of atherosclerosis (cholesterol/arteriole plaques/elasticity loss), hormones/proteins (renin, ADH, angiotensin II, aldosterone, epinephrine, ANP) affecting blood vessels and blood volume. |
| **Content Limits** | None Specified |
| **Stimulus Attributes** | None Specified |
| **Response Attributes** | Not Applicable |
| **Content Focus** | vasoconstriction, vasodilation, blood volume, atherosclerosis, cholesterol/arteriole plaques, elasticity, veins, arteries, heart, coronary arteries, coronary veins, capillaries, hormones, renin, angiotensin II, aldosterone, epinephrine, anti-diuretic hormone |
| **Sample Item** | Which of the following may cause hypertension due to its effect on blood flow?  A) vasodilation causing an increase in blood flow  B) vasoconstriction causing an increase in blood flow  C) adrenaline causing vasoconstriction decreasing blood flow  D) ADH causing a decrease in blood volume reducing blood flow  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.39  Describe hypertension and some of the factors that produce it. |
| **Also Assesses** | SC.912.L.14.31; SC.912.L.14.36 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate, High |
| **Benchmark**  **Clarification** | Student will be able to determine the relationship between those factors  affecting blood flow and hypertension/cardiovascular diseases. |
| **Content Limits** | This benchmark should be limited to vasoconstriction, vasodilation, hormones ADH and angiotensin II, and atherosclerosis. |
| **Stimulus Attributes** | Graphics may be used |
| **Response Attributes** | Not Applicable |
| **Content Focus** | vasoconstriction, vasodilation, anti-diuretic hormone, angiotensin II, atherosclerosis, blood pressure, systolic, diastolic, hypertension, hypotension |
| **Sample Item** | ADH, Anti Diuretic Hormone, controls the reabsorption of water in the kidneys. Which of the following explains how ADH affects blood pressure?  A) lowers blood volume which causes hypertension  \*B B) causes vasoconstriction which causes hypotension  C) increases blood volume which causes hypotension  D) increases blood volume which causes hypertension  Correct Answer: D |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.42  Describe the anatomy and the physiology of the lymph system. |
| **Also Assesses** | SC.912.L.14.52 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low, Moderate |
| **Benchmark**  **Clarification** | Students will be able to identify the major organs of the lymphatic system.  Students will be able to describe the general function of each of those organs. |
| **Content Limits** | Items may reference leukocytes involved in the immune systems (specifically lymphocytes).  Identified organs are limited to lymph vessels, lymph nodes, spleen, (GALT), and (MALT). |
| **Stimulus Attributes** | Diagrams may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | lymph vessels, lymph nodes, spleen, lymphocytes, gut associated lymphoid tissue (GALT), mucosa associated lymphoid tissue (MALT), lymphatic fluid |
| **Sample Item** | Which of these organs are responsible for filtering the fluid that forms between the cells of the body before it is returned to the blood?  A) GALT  B) lymph nodes  C) lymph vessels  D) spleen  Correct Answer: B |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.44  Describe the physiology of the respiratory system including the mechanisms of ventilation, gas exchange, gas transport and the mechanisms that control the rate of ventilation. |
| **Also Assesses** | SC.912.L.14.52; SC.912.L.14.27; SC.912.P.12.10 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate |
| **Benchmark**  **Clarification** | Students will be able to identify the major organs of the respiratory system.  Students will describe how and where gas exchange takes place.  Students will explain control mechanisms for pulmonary ventilation. This may include pH monitoring by the nervous system. This may also include references to the gas laws.  Students will describe mechanisms for the transport of gases. This description may include descriptions of the structure and function of erythrocytes, hemoglobin, alveoli and capillaries.  Students may also be required to describe how the environment may negatively impact the respiratory system. |
| **Content Limits** | Gas law content is limited to its relevance in pulmonary ventilation (pressure inversely proportional to volume). |
| **Stimulus Attributes** | Diagrams may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | erythrocytes, hemoglobin, alveoli, capillaries, pulmonary ventilation, diaphragm, pressure, volume, lungs, nose, larynx, pharynx, trachea, bronchi, bronchioles, respiratory membrane, asthma, bronchitis, inspiration, expiration, diffusion, oxygen, carbon dioxide, pH |
| **Sample Item** | Which of the following explains how the brain initiates pulmonary ventilation when carbon dioxide levels increase and the pH of the blood decreases?  A) stimulates alveoli to grow larger  B) stimulates erythrocytes to grow larger  C) stimulates the diaphragm to relax and decreases lung volume  D) stimulates the diaphragm to contract and increases blood volume  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.46 Describe the physiology of the digestive system, including mechanical digestion, chemical digestion, absorption, and the neural and hormonal mechanisms of control. |
| **Also Assesses** | SC.912.L.18.6; SC.912.L.18.8; SC.912.L.18.11; SC.912.L.18.2; SC.912.L.18.3 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate |
| **Benchmark**  **Clarification** | Students will describe how (Honors: and why) mechanical and chemical  digestion takes place within the organs of the digestive system.  Students will describe how (Honors: and why) absorption takes place within the organs of the digestive system.  Honors: this description will include when/where major macromolecules are extracted, when/where nutrients are absorbed, and the anatomy of the digestive system. |
| **Content Limits** | None Specified |
| **Stimulus Attributes** | Diagrams and illustrations may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | mouth, pharynx, esophagus, stomach, alimentary canal, small intestine, large intestine, appendix, colon, rectum, anus, teeth, salivary glands, pancreas, liver, gallbladder, ingestion, propulsion, absorption, defecation, peristalsis, carbohydrates, lipids, proteins, vitamins, minerals |
| **Sample Item** | Where is the enzyme amylase used to digest carbohydrates such as starch?   1. the mouth and large intestine 2. the mouth and small intestine 3. the stomach and large intestine 4. the small intestine and the stomach   Correct Answer: B |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.47  Describe the physiology of urine formation by the kidney. |
| **Also Assesses** | SC.912.L.14.31 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low, Moderate |
| **Benchmark**  **Clarification** | Students will be able to describe the general function of the nephron. This includes the role of renal pressure on filtrate formation through reabsorption. |
| **Content Limits** | This item does not include what/where molecules are/are not absorbed  into/out of the renal tubules. |
| **Stimulus Attributes** | Diagrams and illustrations may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | urine, kidney, nephron, filtrate, pressure, reabsorption, metabolic waste, glomerulus, renal tubules, collecting ducts |
| **Sample Item** | Which of the following is the functional unit of the kidney responsible for filtering metabolic waste from the blood and maintaining homeostasis?  A) calyx  B) medulla  C) nephron  D) ureter  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.48- Anatomy & Physiology Honors ONLY  Describe the anatomy, histology, and physiology of the ureters, the urinary bladder and the urethra. |
| **Also Assesses** | Not Applicable |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate |
| **Benchmark**  **Clarification** | Students will describe the flow of urine through the urinary system. |
| **Content Limits** | This item will not require students to identify specific regions (or the molecules being moved) along the renal tubules. |
| **Stimulus Attributes** | Diagrams or illustrations may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | transitional epithelium, mucosa, smooth muscle, muscularis, adventitia, ureters, urethra, urinary bladder, trigone, detrusor muscle, rugae, distensible, pseudostratified columnar epithelium, internal urethral sphincter, external urethral sphincter, prostatic urethra, membranous urethra, spongy urethra, external urethral orifice, micturition |
| **Sample Item** | Which of the following identifies the correct sequence of structures through which fluid waste passes out of the body?  A) bladder, urethra, kidney, ureter  B) kidney, bladder, ureter, urethra  C) kidney, ureter, bladder, urethra  D) kidney, urethra, bladder, ureter  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.49  Identify the major functions associated with the sympathetic and parasympathetic nervous systems. |
| **Also Assesses** | Not Applicable |
| **Item Types** | Selected Response, Short Answer |
| **Cognitive Complexity** | Low, Moderate |
| **Benchmark**  **Clarification** | Students will identify the major function of the parasympathetic nervous system as controlling the body’s maintenance system (homeostasis) and the major function of the sympathetic nervous system as controlling the body’s reaction to perceived danger (“fight or flight” response). |
| **Content Limits** | Items will not assess the transmission of nerve impulses along the different pathways.  Items will not assess the effector organs of the sympathetic and parasympathetic nervous systems.  Items will not assess the anatomy of the sympathetic or parasympathetic nervous systems.  Items will not assess the pathways involved during the transmission.  Items will not assess the effects of the parasympathetic and sympathetic nervous systems. |
| **Stimulus Attributes** | None Specified |
| **Response Attributes** | Not Applicable |
| **Content Focus** | sympathetic nervous system, parasympathetic nervous system, autonomic nervous system |
| **Sample Item** | Describe the difference between the major functions of the sympathetic  and parasympathetic nervous systems.  Correct Answer - The sympathetic nervous system helps the body during extreme conditions such as fear or rage. The parasympathetic nervous system helps the body to relax and conserve energy.  2 points - Student provides a complete, accurate, and clear response that demonstrates an understanding of the central idea and provides a correct answer using accurate explanations as support.  1 point - Student provides a partially correct answer to the question or demonstrates a partial understanding of the central idea.  0 points – Student did not provide a response; student response is incorrect or off-topic. |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.50  Describe the structure of vertebrate sensory organs. Relate structure to  function in vertebrate sensory systems. |
| **Also Assesses** | Not Applicable |
| **Item Types** | Selected Response; Short Answer |
| **Cognitive Complexity** | Low, Moderate |
| **Benchmark Clarification** | Students will describe the structure of vertebrate sensory organs.  Students will relate structure to function in vertebrate sensory systems. |
| **Content Limits** | Items will be limited to human sensory organs.  Items will be limited to the eye, the ear, and the olfactory and taste receptors.  Items will not include infections or defects in the sensory systems.  Items will be limited to the major structures of the sensory organs.  Items will not include eye reflexes or the five basic taste sensations. |
| **Stimulus Attributes** | None Specified |
| **Response Attributes** | Not Applicable |
| **Content Focus** | eye, eyelids, eyelashes, conjunctiva, lacrimal apparatus, extrinsic eye muscles, sclera, cornea, choroid, iris, pupil, retina, lens, external ear, olfactory receptors, taste receptors, pinna, auditory canal (external auditory meatus), wax (ceruminous) glands, eardrum (tympanic membrane), auditory tube, ossicles, hammer (malleus), anvil (incus), stirrup (stapes), cochlea, vestibule, semicircular canals, olfactory receptors, taste receptors |
| **Sample Item** | Which of the following is **not** involved in the sense of hearing?  A) ossicles  B) pinna  C) semicircular canals  D) tympanic membrane  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.51  Describe the function of the vertebrate integumentary system. |
| **Also Assesses** | SC.912.L.16.8; SC.912.L.14.29; SC.912.L.14.36; SC.912.L.14.52 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low, Moderate |
| **Benchmark**  **Clarification** | Students will be able to describe the structure and development of the  integumentary system.  Students will be able to describe the functions of the integumentary system including sensory, protection and temperature regulation.  Students should be able to describe all six functions of the integumentary system including covering and lining, thermoregulation, cutaneous sensations, protection against microbial invasion, excretion, and absorption.  Students should describe the structure of the skin, including the epidermis and the five epidermal strata (corneum, lucidum, granulosum, spinosum, and basale), types of cells in each of the layers (keratinocytes, Langerhans cells, melanocytes, Merkel cells), and what state the cells are in at each layer. Example: In stratum basale, the cells are germinating; in granulosum, the cells are dying by undergoing nuclear degeneration; in lucidum, the cells are dead; in corneum, the cells are dead and are continuously shedding.  Students should distinguish the number of layers of cells, with stratum corneum consisting of 25-30 layers of dead keratinized cells. |
| **Content Limits** | The questions may include the process of keratinization.  For non-Honors level courses, items should be limited to identification of functions of the integumentary system.  For Honors level courses, items may require students to explain how the function is accomplished by describing how each anatomical structure (i.e. layers of the epidermis, dermis, or subcutaneous layer) contributes to any given function. |

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| **Stimulus Attributes** | May include diagrams. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | thermoregulation, cutaneous sensations, protection, excretion, covering, lining, absorption, epidermis, epidermal strata (corneum, lucidum, granulosum, spinosum, and basale), keratinocytes, melanocytes, arrector pili muscle, sweat glands, blood vessels, sensory neurons |
| **Sample Item** | Which of the following accurately describes one of the functions of the integumentary system?  A) Arrector pili may contract to cool the body.  B) The sweat glands may release sweat to warm the body.  C) Capillaries may dilate at the skins surface to cool the body off.  D) Blood vessels may constrict at the skin’s surface to cool the body off.  Correct Answer: C |

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| **Reporting Category** | Organisms/Populations/Ecosystems |
| **Standard** | Organization & Development of Living Organisms |
| **Benchmark** | SC.912.L.14.52  Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics. |
| **Also Assesses** | SC.9121.L.14.51; SC.912.L.14.35; SC.912.L.14.6 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low, Moderate |
| **Benchmark**  **Clarification** | Students will describe the factors involved in the immune system. These factors will include both nonspecific and specific defenses.  Students will describe the role of the different types of leukocytes involved in the immune system.  Students will describe the processes involved in an Acute Inflammatory Response.  Students will describe the roles of innate and acquired immunity.  Students will describe the process of immunity including the leukocytes and their roles involved in the process of antibody formation (T cells and B cells).  Students will describe how HIV/AIDS affects the immune system.  Students will describe autoimmune diseases, immunosuppressant therapies, congenital diseases, and allergies manifest as a consequence of immune system function. |
| **Content Limits** | This item does not require students to identify specific modes of  communication between the cells of the immune system.  This item does not require students to identify or explain detailed methods of immunity development. |
| **Stimulus Attributes** | Graphics may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | nonspecific immunity, specific immunity, leukocytes, Acute Inflammatory Response, innate immunity, acquired immunity, antibody formation (T cells and B cells), HIV/AIDS, autoimmune diseases, immunosuppressant therapies, congenital diseases, allergies |
| **Sample Item** | How do vaccines affect the immune system?  A) It causes the immune system to make antibodies.  B) It tricks the immune system into allowing the virus to infect the cells.  C) It confuses the immune system into allowing the first line of defense to be penetrated.  D) It transmits the disease so that the immune system is prepared for  future infections.    Correct Answer: A |

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| **Reporting Category** | Organisms and Populations/Ecosystems |
| **Standard** | Heredity & Reproduction |
| **Benchmark** | SC.912.L.16.10- Anatomy & Physiology Honors ONLY  Evaluate the impact of biotechnology on the individual, society, and the  environment, including medical and ethical issues. |
| **Also Assesses** | Not Applicable |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | High |
| **Benchmark Clarification** | This item may describe how human health has improved because of advances made in biotechnology. Advances may be historical or modern. |
| **Content Limits** | This item will not require students to describe specific methodologies in biotechnology. |
| **Stimulus Attributes** | Graphics may be used. |
| **Response Attributes** | Not Applicable |
| **Content Focus** | biotechnology, ethical issues, medical issues, environment |
| **Sample Item** | Organisms have been genetically modified by scientists to benefit humans. In the following, which organism is correctly paired with its genetically engineered product?  A) plants that make their own CO2 for use in space  B) bacteria that make artificial skin for burn victims  C) plants that make a human protein used by diabetics  D) bacteria that make a blood clotting protein for use by hemophiliacs  Correct Answer: D |

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| **Reporting Category** | Organisms and Populations |
| **Standard** | Heredity & Reproduction |
| **Benchmark** | SC.912.L.16.13- Anatomy & Physiology Honors ONLY  Describe the basic anatomy and physiology of the human reproductive system.  Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy. |
| **Also Assesses** | SC.912.L.14.33 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate, High |
| **Benchmark**  **Clarification** | Students will identify the major organs of the male and female reproductive systems.  Students will describe the development of the male and female reproductive systems.  Students will describe the mechanisms (hormonal) of control of the male and female reproductive systems.  Students will describe human development from fertilization through adulthood.  Students will explain the changes that occur during pregnancy (each trimester) for the developing embryo/fetus and the mother.  Students will explain the process of parturition. |
| **Content Limits** | This item will not require students to describe detailed steps in embryology. |
| **Stimulus Attributes** | Diagrams may be used. |
| **Response Attributes** | Not Applicable |

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| **Content Focus** | testes, sperm, semen, seminal vesicles, prostate gland, epididymis, ductus deferens, bulbourethral gland, urethra, scrotum, penis, testosterone, ovaries, uterus, cervix, vagina, oogenesis, menstrual cycle, mammary glands, fallopian tubes, fertilization, embryo, fetus, trimester, zygote, estrogen, testosterone, follicle-stimulating hormone, luteinizing hormone, follicles, corpus luteum, cleavage, placenta, puberty, menopause |
| **Sample Item** | Which of the following structures of the male reproductive system is considered to be the longest duct that extends from the scrotum and passes into the pelvic cavity?  A) ductus deferens  B) ejaculatory duct  C) epididymis  D) urethra  Correct Answer: A |

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| **Reporting Category** | Molecules and Cells |
| **Standard** | Matter & Energy Transformations |
| **Benchmark** | SC.912.L.18.1  Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules. |
| **Also Assesses** | SC.912.L.18.6; SC.912.L.18.8; SC.912.L.18.11; SC.912.L.14.46 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate |
| **Benchmark**  **Clarification** | Students will describe the major functions of four major macromolecules as basis for the function of the digestive system (nutrient extraction). |
| **Content Limits** | These items are limited the role of macromolecules as nutrients extracted in the digestive system.  This item does not require students to identify the molecular structure of these organic molecules. |
| **Stimulus Attributes** | None Specified |
| **Response Attributes** | Not Applicable |
| **Content Focus** | macromolecule, carbohydrates, proteins, nucleic acids, lipids |
| **Sample Item** | A body builder is put on a very strict diet for an upcoming competition. Which of the following nutrients would you advise the person to increase in their diet?  A) amino acids  B) carbohydrates  C) lipids  D) nucleic acids  Correct Answer: A |

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| **Reporting Category** | Molecular & Cellular Biology |
| **Standard** | Matter & Energy Transformations |
| **Benchmark** | SC.912.L.18.2- Anatomy & Physiology Honors ONLY  Describe the important structural characteristics of monosaccharides,  disaccharides, and polysaccharides, and explain the functions of carbohydrates in living things. |
| **Also Assesses** | SC.912.L.18.1 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Low |
| **Benchmark**  **Clarification** | The focus of this benchmark in anatomy physiology is limited to the role of carbohydrates as nutrients.  Students will describe the process of extracting these nutrients in the digestive system.  Students will describe the role of different carbohydrates in maintaining homeostasis. |
| **Content Limits** | This item does not assess the molecular structure of carbohydrates. |
| **Stimulus Attributes** | None Specified |
| **Response Attributes** | Not Applicable |
| **Content Focus** | carbohydrate, monosaccharide, disaccharide, polysaccharide, glucose, starch, glycogen, maltose, lactose, sucrose, fructose, salivary amylase |
| **Sample Item** | In which of the following ways does the body utilize glucose after it is digested and absorbed?   1. cell membrane structure 2. cellular respiration 3. component of protein structure 4. urine formation   Correct Answer: B |

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| **Reporting Category** | Molecules and Cells |
| **Standard** | Matter & Energy Transformations |
| **Benchmark** | SC.912.L.18.11  Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity. |
| **Also Assesses** | SC.912.L.18.4; SC.912.L.14.46 |
| **Item Types** | Selected Response |
| **Cognitive Complexity** | Moderate |
| **Benchmark**  **Clarification** | Students will identify the enzymes (and their substrates) involved in chemical digestion in the different organs of the digestive system.  Students will identify factors affecting enzymatic activity such as an increase in temperature would cause the particles to collide  more rapidly, which would speed up the reaction. A temperature that is too high would denature the protein thus changing the shape thus changing the function of the enzyme. Enzymes function within a certain range of pH. Too low or too high pH would cause the enzyme to be inactive. |
| **Content Limits** | Items are limited to those enzymes and their substrates as they are related to nutrient extraction in the digestive system. |
| **Stimulus Attributes** | None Specified |
| **Response Attributes** | Not Applicable |
| **Content Focus** | enzyme, substrate, denature, protein, catalyst, activation energy,  active site |
| **Sample Item** | When doing an experiment to investigate the breakdown of food in the mouth, which of the following enzymes should be used?  A) amylase  B) lipase  C) nuclease  D) protease  Correct Answer: A |