Jefferson City Public Schools–High School Curriculum

SUBJECT: Grade 11-12

COURSE: Anatomy and Physiology

STRAND:

Objectives	Assessment/Evaluation	Instructional Activities

(A1) **Unit 1: Organization of the Body**
 	
1. Define anatomy and physiology
2. Describe the structural organization of the human body
3. Explain how one body system relates to another
4. Define the important life processes of humans
5. Define homeostasis and explain its importance
6. Describe the components of a feedback system
7. Compare the operation of a negative and positive feedback system
8. Describe anatomical position
9. Identify the major regions of the body and relate their common names to the corresponding anatomical terms for the various body parts
10. Define the directional terms and the anatomical planes and sections used to locate parts of the human body
11. Describe the principal body cavities and the organs they contain
12. Describe the four basic vital signs used to monitor the human body and recognize when they are within the normal limits
 	
(**Continued to A2**)
	The students will be assessed on concepts taught using a variety of modalities, such as:
	• direct teacher observation
	• class discussion
	• effective questioning technique
	• emphasis on higher order critical thinking skills
	• in-class guided practice
	• homework assignments/independent practice
	• quizzes
	• review of main topics and key vocabulary
	• common formative and summative assessment
	
	Mastery Level: 80%
		<u>Classroom Discussion of Vocabulary and Brain-Based Learning</u>:
		Discuss the best techniques for memorizing information. Students will be given time to practice techniques and memorize terminology
		
		<u>Exercise Lab</u>:
		Students will:
		• collect data
		• graph and analyze the effects of exercise on:
		  • respiratory rate
		  • pulse rate
		  • blood pressure
		  • pulse oximetry

Objectives	Assessment/Evaluation	Instructional Activities
(A2) **(Continued from A1)** 13. Describe the effects of exercise on the human body and explain how the homeostatic mechanisms maintain a steady internal environment during these changes. Explain how the different body systems interact with one another during exercise **Performance: 1.2, 1.4, 1.6, 1.8, 3.5** **Knowledge: (SC) 3,7** **SCCLE:SC3.2.C,F,G: SC7.1.A-D** **NETS: 4c** **DOK: 4**		

Objectives	Assessment/Evaluation	Instructional Activities
(B1) **Unit 2: Chemistry** 1. Define a chemical: • element • atom • ion • molecule • compound • formula unit 2. Explain how chemical bonds form 3. Define a chemical reaction and explain why it is important to the human body 4. Discuss the function of water and inorganic: • acids • bases • salts 5. Define pH and explain how the body attempts to keep pH within the limits of homeostasis 6. Discuss the functions of: • carbohydrates • lipids • proteins (**Continued to B2**)	The students will be assessed on concepts taught using a variety of modalities, such as: • direct teacher observation • class discussion • effective questioning technique • emphasis on higher order critical thinking skills • in-class guided practice • homework assignments/independent practice • review of main topics and key vocabulary • common formative and summative assessment Mastery Level: 80%	<u>Review Packet:</u> Students will work independently outside of class to complete a review of chemistry during Unit 1 <u>pH Lab</u>: Collect data and categorize substances based on pH

Objectives	Assessment/Evaluation	Instructional Activities
(B2) **(Continued from B1)** 7. Explain the importance of: • DNA • RNA • ATP **Performance: 1.6, 1.8** **Knowledge: (SC) 3,7** **SCCLE: SC1.1.E,H; SC3.2.F; SC7.1.A-D** **NETS: 4c** **DOK: 2**		
(C) **Unit 3: Cells** 1. Name and describe the three major parts of the cell 2. Describe the structure and function of the plasma membrane 3. Describe the processes that transport substances across the plasma membrane 4. Describe the structure and function of the: • cytoplasm • cytosol • organelles 5. Outline the sequence of events involved in protein synthesis **Performance: 1.6** **Knowledge: (SC) 3** **SCCLE: SC3.1.C; SC3.2.A,D,E; SC3.3.B** **NETS: N/A** **DOK: 2**	The students will be assessed on concepts taught using a variety of modalities, such as: • direct teacher observation • class discussion • effective questioning technique • emphasis on higher order critical thinking skills • in-class guided practice • homework assignments/independent practice • review of main topics and key vocabulary • common formative and summative assessment Mastery Level: 80%	<u>Sodium/Potassium Pump Activity</u>: Students will construct a cell membrane and diagram the activity of the sodium/potassium pump <u>Protein Synthesis Activity:</u> Students will diagram the steps of protein synthesis

Objectives	Assessment/Evaluation	Instructional Activities
(D) **Unit 4: Tissues** 1. Compare and contrast the general characteristics of the four basic types of tissues 2. Describe the general features of: • epithelial • connective • muscle • nervous tissue 3. Describe the: • structure • location • function of: • epithelial • connective • muscle • nervous tissue **Performance: 1.5, 1.6, 3.5** **Knowledge: (SC) 3** **SCCLE: SC3.1.C; SC3.2.C; SC7.1.B,C** **NETS: 4c** **DOK: 4**	The students will be assessed on concepts taught using a variety of modalities, such as: • direct teacher observation • class discussion • effective questioning technique • emphasis on higher order critical thinking skills • in-class guided practice • homework assignments/independent practice • review of main topics and key vocabulary • microscope lab practical (and retake) • common formative and summative assessment Mastery Level: 80%	Tissue Labs (Epithelial, Connective, Muscular, Nervous): Students will use light microscopes to observe different tissue types and to create detailed, labeled drawings of each tissue

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(E) **Unit 5: Integumentary System** 1. Describe the structure and functions of the skin 2. Explain the pigments involved in skin color 3. Describe the structure and functions of the: • hair • skin glands • nails 4. Explain how the skin helps to regulate body temperature 5. Define the basic terminology associated with cancer and know the: • three types of skin cancer • warning signs **Performance: 1.5, 1.6, 3.5** **Knowledge: (SC) 3** **SCCLE: SC3.1.C; SC3.2.C,G,F; SC7.1.B,C** **NETS: 4c** **DOK: 4**	The students will be assessed on concepts taught using a variety of modalities, such as: • direct teacher observation • class discussion • effective questioning technique • emphasis on higher order critical thinking skills • in-class guided practice • homework assignments/independent practice • review of main topics and key vocabulary • lab practical • common formative and summative assessment Mastery Level: 80%	Skin Lab Students will use light and compound microscopes to observe and draw, and compare and contrast structures and functions of the skin and its accessory structures

Objectives	Assessment/Evaluation	Instructional Activities
(F1) **Unit 6: Skeletal System** 1. Discuss the functions of bone and the skeletal system 2. Classify bones based on their shape and location 3. Describe the parts of the bone 4. Describe the histological features of compact and spongy bone 5. Explain the steps involved in ossification 6. Describe the factors involved in: • bone growth and maintenance • how hormones regulate calcium homeostasis 7. Describe how exercise and mechanical stress affect bone tissue 8. Describe the principal surface markings on bone and the functions of each 9. Classify bones into axial and appendicular divisions 10. Identify the bones of the cat skeleton 11. Define a joint and describe how the structure of a joint determines function 12. Describe the structures and functions of the types of: • fibrous • cartilaginous • synovial joints (**Continued to F2**)	The students will be assessed on concepts taught using a variety of modalities, such as: • direct teacher observation • class discussion • effective questioning technique • emphasis on higher order critical thinking skills • in-class guided practice • homework assignments/independent practice • review of main topics and key vocabulary • lab practicals (and retake) • common formative and summative assessment Mastery Level: 80%	<u>Human Bone Lab:</u> Students will identify and memorize names of: • bones • structures • surface markings <u>Cow Bone Lab</u>: Students will identify and memorize structures present in a cross-section of a long bone

Objectives	Assessment/Evaluation	Instructional Activities
(F2) **(Continued from F1)** 13. Describe the movements that can occur at synovial joints **Performance: 1.6, 3.5** **Knowledge: (SC) 3** **SCCLE: SC3.1.C; SC3.2.C,F** **NETS: N/A** **DOK: 3**		

Objectives	Assessment/Evaluation	Instructional Activities
(G1) **Unit 7: Muscular System** 1. Describe the: • types • functions • characteristics of muscular tissue 2. Explain the relation of: • connective tissue components • blood vessels • nerves to skeletal muscles 3. Describe the histology of a skeletal muscle cell 4. Explain how skeletal muscle fibers contract and relax 5. Describe the sources of ATP and oxygen for muscle contraction 6. Define muscle fatigue and list its possible causes 7. List the reasons that oxygen consumption is higher after exercise than at rest 8. Explain the three phases of a twitch contraction 9. Describe how the frequency of stimulation and motor unit recruitment affects muscle tension 10. Compare fast and slow twitch muscle fibers 11. Distinguish between isotonic and isometric contractions (**Continued to G2**)	The students will be assessed on concepts taught using a variety of modalities, such as: • direct teacher observation • class discussion • effective questioning technique • emphasis on higher order critical thinking skills • in-class guided practice • homework assignments/independent practice • review of main topics and key vocabulary • lab practical • oral group cat dissection quizzes • common formative and summative assessment Mastery Level: 80%	<u>Human Muscle Lab:</u> Students will work in groups to: • name • locate • describe the functions of human muscles and muscle tissues on muscle models <u>Cat Muscle Dissection:</u> Students will: • identify • separate • tag cat muscles • work in groups to memorize the name and function of each muscle <u>Sarcomere Model:</u> Students will construct a model that demonstrates skeletal muscle fibers contracting and relaxing

Objectives	Assessment/Evaluation	Instructional Activities
(G2) **(Continued from G1)** 12. Describe the location and function of skeletal muscles in various regions of the body **Performance: 1.6, 3.5** **Knowledge: (SC) 3** **SCCLE: SC3.1.C; SC3.2.C; SC7.1.B** **NETS: N/A** **DOK: 4**		

Objectives	Assessment/Evaluation	Instructional Activities
(H1) **Unit 8: Nervous System** 1. Describe the components of the nervous system 2. Compare the structure and functions of the neurons and neuroglia 3. Describe how a nerve impulse is generated and conducted 4. Explain the events of a synaptic transmission and the types of neurotransmitters used 5. Describe how the spinal cord is protected 6. Describe the structure and functions of the spinal cord 7. Describe the: • composition • coverings • branches of the spinal nerve 8. Name the principal parts of the brain and explain the functions of each 9. Compare the main structural and functional differences between the somatic and autonomic parts of the nervous system 10. Describe the functions of the sympathetic and parasympathetic divisions of the autonomic nervous system (**Continued to H2**)	The students will be assessed on concepts taught using a variety of modalities, such as: • direct teacher observation • class discussion • effective questioning technique • emphasis on higher order critical thinking skills • in-class guided practice • homework assignments/independent practice • review of main topics and key vocabulary • common formative and summative assessment Mastery Level: 80%	<u>Sheep Brain Lab:</u> Students will identify the structures and functions of the sheep brain <u>Skull Lab:</u> Students will identify and memorize names of: • bones • structures • surface markings

Objectives	Assessment/Evaluation	Instructional Activities
(H2) **(Continued from H1)** 11. Name the cranial and facial bones and indicate their locations and major structural features **Performance: 1.6** **Knowledge: (SC) 3** **SCCLE: SC3.1.C; SC3.2.C,F** **NETS: N/A** **DOK: 3**		

Objectives	Assessment/Evaluation	Instructional Activities
(I) **Unit 9: Digestive System** 1. Identify the organs of the digestive system and their basic functions 2. Describe the structure and functions of the tongue 3. Identify the locations of the salivary glands, and describe the functions of their secretions 4. Describe the: • location • structure • function of the: • pharynx • esophagus • stomach • pancreas • liver • gall bladder • small intestine • large intestine **Performance: 1.6, 3.5** **Knowledge: (SC) 3** **SCCLE: SC3.1.C; SC3.2.C; SC7.1.B** **NETS: N/A** **DOK: 4**	The students will be assessed on concepts taught using a variety of modalities, such as: • direct teacher observation • class discussion • effective questioning technique • emphasis on higher order critical thinking skills • in-class guided practice • homework assignments/independent practice • review of main topics and key vocabulary • oral group dissection quiz • common formative and summative assessment Mastery Level: 80%	<u>Cat Digestive System Dissection:</u> Students will: • dissect the structures and organs of the digestive system • demonstrate an understanding of the: • process of digestion • structures and organs involved and their functions