# Jefferson City Public Schools–High School Curriculum

**SUBJECT:** Grade 11-12  
**COURSE:** Anatomy and Physiology  
**STRAND:**

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

(Continued to A2)
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
<table>
<thead>
<tr>
<th>Objectives</th>
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<tr>
<td><strong>Unit 2: Chemistry</strong></td>
<td></td>
<td><strong>Review Packet:</strong> Students will work independently outside of class to complete a review of chemistry during Unit 1. <strong>pH Lab:</strong> Collect data and categorize substances based on pH.</td>
</tr>
</tbody>
</table>
| 1. Define a chemical:  
  • element  
  • atom  
  • ion  
  • molecule  
  • compound  
  • formula unit | 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 | |
| 2. Explain how chemical bonds form | **Mastery Level: 80%** | |
| 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)
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<tr>
<td><strong>(B2) (Continued from B1)</strong></td>
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</tr>
</tbody>
</table>
| 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 | 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 | Sodium/Potassium Pump Activity:  
Students will construct a cell membrane and diagram the activity of the sodium/potassium pump |
| 2. Describe the structure and function of the plasma membrane | | Protein Synthesis Activity:  
Students will diagram the steps of protein synthesis |
| 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 | Mastery Level: 80% | |
| **Performance: 1.6**  
**Knowledge: (SC) 3**  
**NETS: N/A**  
**DOK: 2** | | |
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</table>
| **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**
**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 |
### Objectives

<table>
<thead>
<tr>
<th>(E) Unit 5: Integumentary System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Describe the structure and functions of the skin</td>
</tr>
<tr>
<td>2. Explain the pigments involved in skin color</td>
</tr>
<tr>
<td>3. Describe the structure and functions of the:</td>
</tr>
<tr>
<td>• hair</td>
</tr>
<tr>
<td>• skin glands</td>
</tr>
<tr>
<td>• nails</td>
</tr>
<tr>
<td>4. Explain how the skin helps to regulate body temperature</td>
</tr>
<tr>
<td>5. Define the basic terminology associated with cancer and know the:</td>
</tr>
<tr>
<td>• three types of skin cancer</td>
</tr>
<tr>
<td>• warning signs</td>
</tr>
</tbody>
</table>

*Performance: 1.5, 1.6, 3.5*

*Knowledge: (SC) 3*


NETS: 4c

DOK: 4

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### Assessment/Evaluation

- 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%

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### Instructional Activities

- **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
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<tr>
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</thead>
</table>
| **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% |
| Human Bone Lab:
  Students will identify and memorize names of:
  - bones
  - structures
  - surface markings |
| Cow Bone Lab:
  Students will identify and memorize structures present in a cross-section of a long bone |
<table>
<thead>
<tr>
<th>Objectives</th>
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<th>Instructional Activities</th>
</tr>
</thead>
</table>

(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

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<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Unit 7: Muscular System</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Describe the:</td>
<td>The students will be assessed on concepts taught using a variety of modalities, such as:</td>
<td>Human Muscle Lab:</td>
</tr>
<tr>
<td>• types</td>
<td>• direct teacher observation</td>
<td>Students will work in groups to:</td>
</tr>
<tr>
<td>• functions</td>
<td>• class discussion</td>
<td>• name</td>
</tr>
<tr>
<td>• characteristics</td>
<td>• effective questioning technique</td>
<td>• locate</td>
</tr>
<tr>
<td>of muscular tissue</td>
<td>• emphasis on higher order critical thinking skills</td>
<td>• describe</td>
</tr>
<tr>
<td>2. Explain the relation of:</td>
<td>• in-class guided practice</td>
<td>the functions of human muscles and muscle tissues on muscle models</td>
</tr>
<tr>
<td>• connective tissue components</td>
<td>• homework assignments/independent practice</td>
<td>Cat Muscle Dissection:</td>
</tr>
<tr>
<td>• blood vessels</td>
<td>• review of main topics and key vocabulary</td>
<td>Students will:</td>
</tr>
<tr>
<td>• nerves</td>
<td>• lab practical</td>
<td>• identify</td>
</tr>
<tr>
<td>to skeletal muscles</td>
<td>• oral group cat dissection quizzes</td>
<td>• separate</td>
</tr>
<tr>
<td>3. Describe the histology of a skeletal muscle cell</td>
<td>• common formative and summative assessment</td>
<td>• tag</td>
</tr>
<tr>
<td>4. Explain how skeletal muscle fibers contract and relax</td>
<td>Mastery Level: 80%</td>
<td>cat muscles</td>
</tr>
<tr>
<td>5. Describe the sources of ATP and oxygen for muscle contraction</td>
<td></td>
<td>• work in groups to memorize the name and function of each muscle</td>
</tr>
<tr>
<td>6. Define muscle fatigue and list its possible causes</td>
<td></td>
<td>Sarcomere Model:</td>
</tr>
<tr>
<td>7. List the reasons that oxygen consumption is higher after exercise than at rest</td>
<td></td>
<td>Students will construct a model that demonstrates skeletal muscle fibers contracting and relaxing</td>
</tr>
<tr>
<td>8. Explain the three phases of a twitch contraction</td>
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<tr>
<td>9. Describe how the frequency of stimulation and motor unit recruitment affects muscle tension</td>
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<tr>
<td>10. Compare fast and slow twitch muscle fibers</td>
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<tr>
<td>11. Distinguish between isotonic and isometric contractions</td>
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(Continued to G2)
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
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<tbody>
<tr>
<td><strong>Unit 8: Nervous System</strong></td>
<td>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</td>
<td>Sheep Brain Lab: Students will identify the structures and functions of the sheep brain&lt;br&gt;Skull Lab: Students will identify and memorize names of: • bones • structures • surface markings</td>
</tr>
<tr>
<td>1. Describe the components of the nervous system</td>
<td>Mastery Level: 80%</td>
<td><strong>Instructional Activities</strong></td>
</tr>
<tr>
<td>2. Compare the structure and functions of the neurons and neuroglia</td>
<td></td>
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<tr>
<td>3. Describe how a nerve impulse is generated and conducted</td>
<td></td>
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<tr>
<td>4. Explain the events of a synaptic transmission and the types of neurotransmitters used</td>
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<tr>
<td>5. Describe how the spinal cord is protected</td>
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<tr>
<td>6. Describe the structure and functions of the spinal cord</td>
<td></td>
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<tr>
<td>7. Describe the: • composition • coverings • branches of the spinal nerve</td>
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<tr>
<td>8. Name the principal parts of the brain and explain the functions of each</td>
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<tr>
<td>9. Compare the main structural and functional differences between the somatic and autonomic parts of the nervous system</td>
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<tr>
<td>10. Describe the functions of the sympathetic and parasympathetic divisions of the autonomic nervous system</td>
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<td>(Continued from H1)</td>
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<tr>
<td>11. Name the cranial and facial bones and indicate their locations and major structural features</td>
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</tbody>
</table>

**Performance:** 1.6  
**Knowledge:** (SC) 3  
**SCCLE:** SC3.1.C; SC3.2.C,F  
**NETS:** N/A  
**DOK:** 3
## Objectives

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

## Assessment/Evaluation

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%