HS
Anatomy and Physiology
Curriculum Map

Revised 6/2011
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Teams of Lake County teachers created the curriculum maps in order to ensure that all students throughout the district receive a common curriculum. The maps help ensure that all state requirements are taught and that the content is divided into teachable segments with appropriate pacing. The curriculum maps will guide your instruction but provide flexibility based on the individual needs of students. The maps are living documents and feedback is requested of teachers to ensure continuous improvement.

All teachers are expected to use the curriculum maps, in conjunction with data, to drive instruction. The maps were designed for the instruction to take place by quarter. There is some flexibility within the quarters for mastery and re-teaching. The expectation is that teachers will finish the content within each quarter in its entirety. The maps have been structured in such a way as to scaffold student learning.

Listed below are a few of the new or updated features common to all curriculum maps:

**Essential Question(s):**
- Provide application of the skills/concepts
- Have more than one right answer which promotes student discourse
- Increase the rigor in the classroom, by changing from teacher-centered to student-centered learning
- Are referred to at the beginning, middle, and end of the lesson
- Require you to make a decision
- Promote critical thinking and problem solving
- Encourage interdependence
- Are open-ended

**Academic Vocabulary** are:
- Unfamiliar vocabulary that are essential to understanding new content within explicit instruction
- Not necessarily the bold words in the chapter.
- Cumulative and continuously used throughout the year.
- Integrated into word walls, a research-based strategy that will facilitate vocabulary acquisition.
Common Board Configuration Elements (specific layouts may vary by sites, but must include each of these):

- **Purpose**: For the student to know what is being taught and what the student will learn
  - Date
  - Benchmark
  - Measurable, student-friendly objective
  - Essential Question
  - Bell work
  - Agenda (Specific daily schedule)
  - Homework
  - Exit Strategy/Card

Lessons that infuse reading, writing, and discussion are imperative components of every subject area. There should be **daily**:

- Teacher to student and student to student discourse utilizing academic vocabulary.
- Reading and authentic writing
- Writing that includes higher-order thinking
- Incorporation of effective reading and writing instructional strategies

Maps are organized to include the following:

- Pacing
- Objective
- Essential questions, content and understanding, benchmarks, and assessment
- Appendix/ resources
Next Generation Sunshine State Standards

Science Benchmark Coding Scheme

<table>
<thead>
<tr>
<th>SC.</th>
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</thead>
<tbody>
<tr>
<td>Subject</td>
<td>Grade Level</td>
<td>Body of Knowledge</td>
<td>Big Idea / Supporting Idea</td>
<td>Benchmark</td>
</tr>
</tbody>
</table>

Body of Knowledge Key

N ~ Nature of Science  E ~ Earth Space Science
L ~ Life Science  P ~ Physical Science

Big Idea Key

#1 – The Practice of Science  #10 – Forms of Energy
#2 – The Characteristics of Scientific Knowledge  #11 – Energy Transfer and Transformation
#3 – The Role of Theories, Laws, Hypotheses, and Models  #12 – Moon Objects
#4 – Science and Society  #13 – Forces and Changes in Motion
#5 – Earth in Space and Time  #14 – Organization and Development of Living Organisms
#6 – Earth Structures  #15 – Diversity and Evolution of Living Organisms
#7 – Earth Systems and Patterns  #16 – heredity and Reproduction
#8 – Properties of Matter  #17 – Interdependence
#9 – Changes in Matter  #18 – Matter and Energy Transformations

Language Arts and Mathematic Benchmarks

The Language Arts and Mathematic benchmarks are in the course description. These benchmarks have been integrated throughout the curriculum map.

Differentiated Instruction Strategies

The following differentiated instruction strategies should be incorporated throughout the entire course:

- Cooperative Groups
- Computer Assisted Instruction
- Tiered Assignments
- Centers
- Flexible Grouping
- Curriculum Compacting/Contracts
- Learning Stations
- Scaffolding
- Hands-on Instruction
- Leveled Texts/Resources
- Teacher Led Small Groups
- Web Quest
This chart is to show where the Big Ideas are located by grade level. This will help to give an understanding as to why complete coverage of the NGSSS at each grade level is essential!!

<table>
<thead>
<tr>
<th>Big Idea #1 The Practice of Science</th>
<th>Big Idea #2 The Characteristics of Scientific Knowledge</th>
<th>Big Idea #3 The Role of Theories, Laws, Hypotheses, and Models</th>
<th>Big Idea #4 Science and Society</th>
<th>Big Idea #5 Earth in Space and Time</th>
<th>Big Idea #6 Earth Structures</th>
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<td>#7 Earth Systems and Patterns</td>
<td>#8 Properties of Matter</td>
<td>#9 Changes in Matter</td>
<td>#10 Forms of Energy</td>
<td>#11 Energy Transfer and Transformations</td>
<td>#12 Motion of Objects</td>
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Reading Writing Discussion in the Science Classroom Everyday

- Reading Writing Discussion in the classroom everyday (33% of R&W&D everyday)

This means that during each class period the students should be reading, writing, and talking about Science. Many of these overlap in a combination of Reading, Writing, and Discussion.

**Reading Writing Discussion in the Science Classroom:**

What do these look like in the Science classroom?

What **DOES** the reading process look like?

- Modeling - reading and thinking out loud
- Students in small groups or pairs
- Whole group when referring to a specific portion of the text
- Use of graphic organizers
- Reading and following lab instructions
- Reading a section for homework at home

What **DOES** the writing process look like?

- Lab report
- Small group or pairs jotting down important points
- Journal writing
- Answering selected questions from the textbook in complete sentences
- Completing graphic organizer
- Entry or Exit card
- Taking notes
- Writing prompt
- Responding to open ended questions

What **DOES** the discussion process look like?
Reading Writing Discussion in the Science Classroom Everyday

- Student discourse – discussion among and between the students about the topic (Could be in small group, pair, pair share, lecture (should involve two way communication))
- About labs, reading, current events, responses to open ended questions, essential questions, etc.
- Imbedding vocabulary terms/word wall, academic vocabulary, into the discussion

❖ The county approved textbook is a resource.

How to best use of the textbook to aid student comprehension:
- At the beginning of each term have the students participate in a “preview” of the textbook.
  - Table of contents
  - Chapter titles
  - Headings/subheadings
  - Graphics on the page, i.e. charts, graphs, pictures, maps tables,
  - Bold, italic, highlighted words
  - Glossary
  - Appendices

- Incorporate the following for each chapter:
  By doing the following you will enhance a student’s comprehension:
  - Before reading – preview, skim for new vocabulary, look at headings and subheadings, graphics,
  - During reading – Review the reading column of the chart for suggested activities.
  - After reading – Review writing and discussion columns of the chart for suggested activities.
### Reading Writing Discussion in the Science Classroom

<table>
<thead>
<tr>
<th><strong>Reading</strong></th>
<th><strong>Writing</strong></th>
<th><strong>Discussion</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Silent reading</td>
<td>Essential Question</td>
<td>Paired reading</td>
</tr>
<tr>
<td>At home reading</td>
<td>Cornell notes</td>
<td>Jig Saw</td>
</tr>
<tr>
<td>Oral</td>
<td>Small group notes</td>
<td>Think Pair Share</td>
</tr>
<tr>
<td>Read Aloud</td>
<td>Entry or Exit Card</td>
<td>Share out/Group presentations</td>
</tr>
<tr>
<td>Think Aloud</td>
<td>Graphic Organizers</td>
<td>*Lectures (should involve two way</td>
</tr>
<tr>
<td>Lab instructions (pre, during, post)</td>
<td></td>
<td>communication)</td>
</tr>
<tr>
<td>Silently Sustained Reading – student choice</td>
<td>Writing Prompt</td>
<td>Read Aloud</td>
</tr>
<tr>
<td>Research paper</td>
<td>Selected textbook questions</td>
<td>Think aloud</td>
</tr>
<tr>
<td><em>Reading could be from textbook, current event, supplemental texts, websites, etc.</em></td>
<td>(Answered with complete sentences)</td>
<td>3-2-1Strategy</td>
</tr>
<tr>
<td></td>
<td>Worksheet</td>
<td>Lab Write up</td>
</tr>
<tr>
<td></td>
<td>3-2-1Strategy</td>
<td>Lab instructions (pre, during, post)</td>
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<tr>
<td></td>
<td>Lab Write up</td>
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<td>Journal writing</td>
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<td></td>
<td>Responding to open ended questions</td>
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<td></td>
<td>Research paper</td>
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</table>

The above chart contains a sampling of suggestions and is not intended to be comprehensive.
Lab requirements:
- Teachers will complete the “List of labs” form and a copy of the form will be given to the department chair at the end of each quarter for both middle and high schools.
- For ALL middle school Science courses:
  - a minimum of 8 labs per nine weeks
- For high school Science course:
  - For Regular courses – 1 per week
  - For Honors courses – 2 per week

Research paper requirements:
- All Science courses in Lake County will complete a Science research paper for the content area of the course. APA format required.

Science Fair or Competition:
- All middle and high school have the traditional Science Fair option for all grade levels to participate. Each school has a Science Fair Coordinator to help with the process for the students and the teachers.
- There are additional types of “Science” competitions, different from the traditional Science Fair at some schools, that students are encouraged to participate.

Board Approved Programs:
- At High School this is through the HOPE course.
- Human Growth and Development – 6th-8th grade
<table>
<thead>
<tr>
<th>First Quarter</th>
<th>Second Quarter</th>
<th>Third Quarter</th>
<th>Fourth Quarter</th>
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<tbody>
<tr>
<td><strong>FCIM/Focus Calendar</strong></td>
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<td><strong>FCIM/Focus Calendar</strong></td>
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<tr>
<td><strong>1) Lab Safety &amp; Class Procedures</strong></td>
<td><strong>1) Skeletal System</strong></td>
<td><strong>1) Endocrine</strong></td>
<td><strong>1) Respiration</strong></td>
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<tr>
<td><strong>2) Introduction to the Body</strong></td>
<td><strong>2) Muscular System</strong></td>
<td><strong>2) Blood</strong></td>
<td><strong>2) Digestive System</strong></td>
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<tr>
<td>• Structural organization</td>
<td>• Structure &amp; Function of bone</td>
<td>• Composition</td>
<td>• Structure &amp; function</td>
</tr>
<tr>
<td>• Life functions &amp; needs</td>
<td>• Axial Skeleton</td>
<td>• Functions</td>
<td>• Mechanical &amp; chemical digestion, absorption</td>
</tr>
<tr>
<td>• Feedback loops</td>
<td>• Appendicular Skeleton</td>
<td>• Hemostasis/coagulation</td>
<td>• Neural &amp; hormonal control</td>
</tr>
<tr>
<td>• Anatomy terminology</td>
<td><strong>3) Nervous System</strong></td>
<td>• Blood types/transfusions</td>
<td><strong>3) Urinary System</strong></td>
</tr>
<tr>
<td><strong>3) Chemistry &amp; Cells overview</strong></td>
<td><strong>3) Circulatory System</strong></td>
<td><strong>4) Lymphatic System &amp; Body Defenses</strong></td>
<td><strong>4) Reproduction System</strong></td>
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<tr>
<td>• Enzymes</td>
<td>• Anatomy of the heart</td>
<td>• Nonspecific body defenses</td>
<td>• Structure &amp; Function</td>
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<tr>
<td>• Organic molecules</td>
<td>• Blood flow</td>
<td>• Specific body defenses</td>
<td>• Pregnancy &amp; Fetal development</td>
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<tr>
<td>• Cells, Cell division, Cancer</td>
<td>• Circulation pathways</td>
<td>• Lymphatic structure &amp; function</td>
<td><strong>4) Reproduction System</strong></td>
</tr>
<tr>
<td>• Membrane transport</td>
<td>• Physiology of circulation</td>
<td>• Vaccines &amp; antibiotics</td>
<td><strong>4) Reproduction System</strong></td>
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<tr>
<td><strong>4) Body Tissues</strong></td>
<td><strong>4) Integument System</strong></td>
<td><strong>5) Urinary System</strong></td>
<td><strong>5) Reproduction System</strong></td>
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<tr>
<td>• Epithelial Tissue</td>
<td><strong>5) Reproduction System</strong></td>
<td><strong>6) Lymphatic System &amp; Body Defenses</strong></td>
<td><strong>6) Lymphatic System &amp; Body Defenses</strong></td>
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<tr>
<td>• Connective tissue</td>
<td>• Structure &amp; Function</td>
<td>• Nonspecific body defenses</td>
<td><strong>6) Lymphatic System &amp; Body Defenses</strong></td>
</tr>
<tr>
<td>• Muscle Tissue</td>
<td>• Specific body defenses</td>
<td>• Lymphatic structure &amp; function</td>
<td><strong>6) Lymphatic System &amp; Body Defenses</strong></td>
</tr>
<tr>
<td>• Nervous Tissue</td>
<td>• Vaccines &amp; antibiotics</td>
<td></td>
<td><strong>6) Lymphatic System &amp; Body Defenses</strong></td>
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</tbody>
</table>
Anatomy & Physiology

Topic: Introduction to the Body, Chemistry & Cells, Body Tissues, Integument System
Time Frame – 1st quarter

<table>
<thead>
<tr>
<th>Essential Questions</th>
<th>Essential Content &amp; Understandings</th>
<th>Essential Skills &amp; Benchmarks</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why do we have safety procedures in place in a lab?</td>
<td>1) Lab Safety, Class Procedures, review of the scientific method <strong>Flinn lab safety rules &amp; quiz</strong></td>
<td>SC. 912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural</td>
<td>Formal: • Flinn Safety quiz (80% on Quiz ) Informal: • Discussion Word Wall Problem, hypothesis, independent variable, dependent variable, control, peer review, <a href="http://www.cloudnet.com/~edrbsass/edsci.htm">http://www.cloudnet.com/~edrbsass/edsci.htm</a> #scientificmethod</td>
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</tbody>
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Anatomy & Physiology

Topic - Introduction to the Body, Chemistry & Cells, Body Tissues, Integument System
Time Frame – 1st quarter

<table>
<thead>
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<th>Essential Skills &amp; Benchmarks</th>
<th>Assessment</th>
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</thead>
</table>
| How is the body organized? | 2) Introduction to the Body  
• Structural organization  
o  Cells \( \rightarrow \) body systems  
o  Life functions & needs  
o  Maintenance boundaries  
o  Movement  
o  Responsiveness  
o  Digestion  
o  Metabolism  
o  Excretion  
o  Reproduction | SC.912.N.1.2 Describe and explain what characterizes science and its methods information | |  
| What does the body do to maintain life? | 9. use appropriate evidence and reasoning to justify these explanations to others,  
10. communicate results of scientific investigations, and  
11. evaluate the merits of the explanations produced by others | | |  

The following standards are covered throughout the course:  SC.912.N.1.1; SC.912.N.1.2; HE.912.C1.3; HE.912.C.1.4; LA910.2.2.3; LA.910.4.2.2; MA.912.S.1.2; MA.912.S.3.2;  Revised 6/2011
The following standards are covered throughout the course: SC.912.N.1.1; SC.912.N.1.2; HE.912.C.1.3; HE.912.C.1.4; LA910.3.2; LA910.4.2.2; MA.912.S.1.2; MA.912.S.3.2; Revised 6/2011
Anatomy & Physiology

Topic: Introduction to the Body, Chemistry & Cells, Body Tissues, Integument System
Time Frame – 1st quarter

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<th>Essential Skills &amp; Benchmarks</th>
<th>Assessment</th>
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<tbody>
<tr>
<td>What are the basic molecules that make up the human body? How do they work?</td>
<td>• Organic molecules</td>
<td>SC.912.L.18.3 Describe the structures of fatty acids, triglycerides, phospholipids, and steroids. Explain the functions of lipids in living organisms. Identify some reactions that fatty acids undergo. Relate the structure and function of cell membranes.</td>
<td>protein, nucleic acid, mutation, cancer, diffusion, osmosis</td>
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<td>• Cells, Cell division &amp; Cancer</td>
<td>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.</td>
<td><a href="http://www.cellsalive.com">www.cellsalive.com</a></td>
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<td>o Plant vs. animal cells</td>
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<td>o Mutations—cell cycle—cancer</td>
<td>SC.912.L.16.8 Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer</td>
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Why is cancer a disease that can affect any living organism? Why is it so difficult to cure?

The following standards are covered throughout the course: SC.912.N.1.1; SC.912.N.1.2; HE.912.C1.3; HE.912.C1.4; LA910.2.2.3; LA.910.4.2.2; MA.912.S.1.2; MA.912.S.3.2; Revised 6/2011
Anatomy & Physiology

**Topic- Introduction to the Body, Chemistry & Cells, Body Tissues, Integument System**
**Time Frame – 1st quarter**

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</table>
| What role does the cell membrane play in cell communication? | • Membrane transport  
  o Diffusion, osmosis, active transport, etc | SC.912.L.14.2 Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive & active). | Formal:  
  • Vocabulary Quiz  
  • Chapter Test  
Informal:  
  • Tissue microscope lab  
**Word Wall Activity:** Epithelial tissue, connective tissue, muscle tissue, nervous tissue, cardiac muscle, striated muscle, smooth muscle |

<table>
<thead>
<tr>
<th>How are structure and function related for each of the types of body tissues?</th>
<th>4) Body Tissues</th>
<th>SC.912.L.14.11 Classify and state the defining characteristics of epithelial tissue, connective tissue, muscle tissue, and nervous tissue</th>
<th></th>
</tr>
</thead>
</table>
| • Epithelial Tissue  
  o Structure and function  
  o Endocrine vs. exocrine tissue | • Connective tissue  
  o Structure and function | | |
| • Muscle Tissue  
  o Structure and function | • Nervous Tissue  
  o Structure and function | | |

The following standards are covered throughout the course: SC.912.N.1.1; SC.912.N.1.2; HE.912.C1.3; HE.912.C.1.4; LA910.2.2.3; LA.910.4.2.2; MA.912.S.1.2; MA.912.S.3.2;  
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Anatomy & Physiology

**Topic:** Introduction to the Body, Chemistry & Cells, Body Tissues, Integument System

**Time Frame – 1st quarter**

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| What is the purpose of the integumentary system? | **5) Integument System** | SC.912.L.14.51 Describe the function of the vertebrate integumentary system. | Formal:  
  - Vocabulary Quiz  
  - Chapter Test  

Informal:  
  - Skin disease pamphlet  

**Word Wall Activity:** Epithelial membrane, cutaneous membrane, mucous membrane, serous membrane, keratin, melanin, sebaceous glands, sudoriferous glands |

What are various diseases associated with the integumentary system?

- Structure & function
  - Skin
  - Hair
  - Nails
  - Skin diseases

The following standards are covered throughout the course: SC.912.N.1.1; SC.912.N.1.2; HE.912.C1.3; HE.912.C.1.4; LA910.2.2; LA.910.4.2.2; MA.912.S.1.2; MA.912.S.3.2;  

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### Anatomy & Physiology

**Topic:** Skeletal System, Muscular System, Nervous System  
**Time Frame:** 2nd Quarter

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</thead>
</table>
| **1) Skeletal System** | - Anatomy & Function of bone tissue  
  - Axial Skeleton  
  - Appendicular Skeleton | SC.912.14.12 Describe the anatomy and histology of bone tissue | Formal:  
  - Vocabulary Quiz  
  - Bone Practical  
  - Chapter Test  

Informal:  
  - Clay/toothpick skeleton model

**Word Wall activity:**  
Axial skeleton, appendicular skeleton, osteocytes, ossification, osteoclasts, fracture, hematoma, fontanel, articulation

[http://homes.bio.psu.edu/people/faculty/strauss/anatomy/skel/skeletal.htm](http://homes.bio.psu.edu/people/faculty/strauss/anatomy/skel/skeletal.htm)

| - SC.912.L.14.14 Identify the major bones of the axial and appendicular skeleton | SC.912.L.14.16 Describe the anatomy and histology, including ultrastructure, of muscle tissue | Formal:  
  - Vocabulary Quiz  
  - Chapter Test  

Informal:  
  - Muscle anatomy models  
  - Muscle fatigue activity |
| - SC.912.L.14.13 Distinguish between the bones of the axial and appendicular skeleton | | |
| **2) Muscular System** | - Structure & function  
  - Muscle anatomy | | |
| - 3 types of muscles | - Microscopic make up of a skeletal muscle  
  - Physiology of a skeletal muscle | | |
| Why is the muscular system important? | | | |
| How do muscles contract? | | | |
| What diseases are associated with this system? | | | |

The following standards are covered throughout the course:  
SC.912.N.1.1; SC.912.N.1.2; HE.912.C1.3; HE.912.C.1.4; LA910.2.2.3; LA.910.4.2.2; MA.912.S.1.2; MA.912.S.3.2;  
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| Why is the nervous system important?           | Muscle Contraction  
  o Sliding filament theory  
  o Muscle identification  
  o Identify major muscles on a model or diagram  
  o Myoneural Junction  
  o Transmission of a signal from a nerve to a muscle  
  3) Nervous System  
  o Structure & function  
    o Parts of the brain  
    o Parts of the spinal cord  
  o CNS & PNS  
    o Divisions of each  
    o Types of cells in each  
  o Nerve impulse transmission  
    o Parts of the synapse  
    o Transmission of a signal across a synapse | SC.912.L.14.17 List the steps involved in the sliding filament of muscle contraction.  
SC.912.L.14.20 Identify the major muscles of the human on a model or diagram.  
SC.912.L.14.18 Describe signal transmission across a myoneural junction.  
SC.912.L.14.26 Identify the major parts of the brain on diagrams or models.  
SC.912.L.14.28 Identify the major functions of the spinal cord.  
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.  
SC.912.L.14.24 Identify the general parts of a synapse and describe the physiology of signal transmission across a synapse. | Word Wall activity:  
Muscle fiber, motor unit, neurotransmitter, tetanus, muscle tone, origin, insertion, prime mover, antagonist, synergist, fixator  
www.gwc.maricopa.edu/class/bio201/muscle/mustut.htm  
This site contains interactive diagrams for identifying muscles.  

Formal:  
- Vocabulary Quiz  
- Chapter Test  

Informal:  
- Senses foldable  
- Senses lab  
- Neuron models  
- Brain dissection  
- Eye dissection  

Word Wall activity:  
CNS, PNS, neuroglia, neuron, synapse, axon, dendrite, |
Anatomy & Physiology

**Topic**- Skeletal System, Muscular System, Nervous System

**Time Frame** – 2nd Quarter

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</table>
| How are reflex arcs different from a regular nerve transmission? | - Reflex arcs  
  o Sensory receptor, effector organ, sensory and motor neurons, integration center | SC.912.L.14.23 Identify the parts of a reflex arc  
| What diseases are associated with this system? | - Sympathetic & Parasympathetic divisions  
  o Function of each | SC.912.L.14.49 Identify the major functions associated with the sympathetic and parasympathetic nervous systems | reflex, special senses |
|                      | - Sense organs  
  o Relate structure to function for  
  o each of the sense organs | SC.912.L.14.50 Describe the structure of vertebrate sensory organs. Relate structure to functions in vertebrate sensory systems. | |
The following standards are covered throughout the course: SC.912.N.1.1; SC.912.N.1.2; HE.912.C1.3; HE.912.C.1.4; LA910.2.2.3; LA.910.4.2.2; MA.912.S.1.2; MA.912.S.3.2; Revised 6/2011
### Anatomy & Physiology

**Topic-Endocrine, Blood, Circulatory System, Lymphatic System & Body Defenses**  
**Time Frame – 3rd Quarter**

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| How does the circulatory system function to cycle blood through the body? | 3) Circulatory System  
- Structure & Function  
  - Anatomy of the heart, blood vessels  
- Blood flow  
  - Pathway through the heart  
  - Factors that affect blood flow  
- Pathways of circulation  
  - Systemic circulation  
  - Arterial supply to the brain  
  - Hepatic portal circulation  
  - Fetal circulation  
- Physiology of circulation  
  - Heart sounds and what they mean  
  - Hypertension and risk factors | SC.912.L.14.36 Describe the factors affecting blood flow through the cardiovascular system  
SC.912.L.14.41 Describe fetal circulation and changes that occur to the circulatory system at birth  
SC.912.L.14.38 Describe the normal heart sounds and what they mean.  
SC.912.L.14.39 Describe hypertension and some factors that produce it. | erythrocytes, hemostasis, hemophilia, antigen, antibodies, hemolysis |
| How does the heart beat? | | | |
| What factors affect the heart? | | | |
| How does the fetal circulatory system change after birth? | | | |
| What diseases are associated with this system? | | | |

The following standards are covered throughout the course: SC.912.N.1.1; SC.912.N.1.2; HE.912.C1.3; HE.912.C.1.4; LA910.2.2.3; LA.910.4.2.2; MA.912.S.1.2; MA.912.S.3.2;  
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**Anatomy & Physiology**

**Topic-Endocrine, Blood, Circulatory System, Lymphatic System & Body Defenses**

**Time Frame – 3rd Quarter**

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| How do nonspecific and specific body defenses keep the human body healthy? | **4) Lymphatic System & Body Defenses**  
- Nonspecific body defenses  
  o Skin  
  o Mucous membranes  
  o Secretions  
  o Phagocytes  
  o Antimicrobial proteins  
  o Inflammatory response  
- Specific body defenses  
  o Lymphocytes  
  o Antibodies  
  o Macrophages  
- Lymphatic structure & function  
- Vaccines & antibiotics | SC.912.L.14.42 Describe the anatomy and physiology of the lymph system  
SC.912.L.14.52 Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics | Formal:  
- Vocabulary Quiz  
- Chapter Test  
Informal:  
- Specific and nonspecific word wall activities  
Word Wall activity:  
- Edema, lymph, immunity, pathogen, phagocytes, inflammatory response, diapedesis, pyrogens, antigen, vaccine  
http://uhaweb.hartford.edu/BUGL/immune.htm |
| How does the lymphatic system function in helping the body stay healthy? | | | |
| What is difference between vaccines and antibiotics? | | | |
| What diseases are associated with this system? | | | |

The following standards are covered throughout the course: SC.912.N.1.1; SC.912.N.1.2; HE.912.C1.3; HE.912.C.1.4; LA910.2.2.3; LA.910.4.2.2; MA.912.S.1.2; MA.912.S.3.2; Revised 6/2011
The following standards are covered throughout the course: SC.912.N.1.1; SC.912.N.1.2; HE.912.C1.3; HE.912.C.1.4; LA910.2.2.3; LA.910.4.2.2; MA.912.S.1.2; MA.912.S.3.2; Revised 6/2011
### Anatomy & Physiology Honors

**Topic - Respiration, Digestive System, Urinary System, Reproductive System**  
**Time Frame – 4th Quarter**

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| How does the respiratory system and circulatory system work together to transport vital gases throughout the body?  
What diseases are associated with this system? | **1) Respiration**  
- Structure & Function  
  - Organs of respiratory system  
- Respiratory physiology  
  - Process of ventilation  
  - Gas exchange  
  - Gas transport  
  - Mechanisms that control ventilation | 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 | **Formal:**  
  - Vocabulary Quiz  
  - Chapter Test  

**Informal:**  
  - Exhaling CO2 Lab Report  
  - Clay models of system  

**Word Wall activity:** Pharynx, larynx, bronchi, alveoli, respiration, diaphragm, eupnea, cyanosis, cystic fibrosis  
http://www.getbodysmart.com/ap/respiratorysystem/menu/animation.html | **Informal:**  
  - Exhaling CO2 Lab Report  
  - Clay models of system  
| **Formal:**  
  - Vocabulary Quiz  
  - Chapter Test  

| | **2) Digestive System**  
- Structure & Function  
- Mechanical & chemical digestion, absorption  
  - Location of each process  
  - Describe how each process | SC.912.L.14.46 Describe the physiology of the digestive system, including mechanical digestion, chemical digestion, absorption and neural and hormonal | | **Informal:**  
  - Digestive System Project  
  - Clay models of digestive system  

**Word Wall activity:** Alimentary canal, |  |  |  |

The following standards are covered throughout the course: SC.912.N.1.1; SC.912.N.1.2; HE.912.C.1.3; HE.912.C.1.4; LA910.2.2.3; LA.912.4.2.2; MA.912.S.1.2; MA.912.S.3.2; Revised 6/2011
# Anatomy & Physiology Honors

**Topic** - Respiration, Digestive System, Urinary System, Reproductive System  
**Time Frame** – 4th Quarter

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</table>
| this system?        | works to digest food and supply the body with nutrients  
• Hormonal/neural control | SC. 912.L.14.47 Describe the physiology of urine formation by the kidney | mastication, microvilli, peristalsis, deglutition, cellular respiration, metabolism, obesity  
http://digestive.niddk.nih.gov/ddiseases/pubs/yrdd/ |
| How does the urinary system filter blood? | 3) Urinary system  
• Structure & Function  
• Urine Formation  
  o Filtration, tubular reabsorption, tubular secretion  
  o Components of urine (normal & abnormal) | | Formal:  
• Vocabulary Quiz  
• Chapter Test  
Informal:  
• Filtration lab  
• Simulated urine lab  
Word Wall activity:  
Renal, nephron, glomerulus, filtration, urea, reabsorption, secretion, micturition  
http://webanatomy.net/anatomy/urinary_notes.htm |
| What diseases are associated with this system? | | | |

The following standards are covered throughout the course: SC.912.N.1.1; SC.912.N.1.2; HE.912.C1.3; HE.912.C.1.4; LA910.2.2; LA.910.4.2.2; MA.912.S.1.2; MA.912.S.3.2;  
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| What are the functions of the male and female reproductive systems? | 4) Reproduction System  
- Structure & Function of Reproductive system  
- Pregnancy & Fetal development  
  o Basic overview | SC.912.L.16.13 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.  
HE.912.C.1.4 Analyze how hereditary and family history can impact personal health  
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.  
SC.912.L.14.41 Describe fetal circulation and changes that occur to the circulatory system at birth | Formal:  
- Vocabulary Quiz  
- Chapter Test  
Informal:  
- Miracle of Life video |
| How do the ovarian and uterine cycles work together to make it possible for reproduction? | Mammalian Dissection (ex: cat, pig) | This lab will review all Standards covered above. | Word Wall activity:  
Gonads, gametes, testes, ovaries, semen, scrotum, uterus, oogenesis, spermatogenesis, embryo, fetus  
http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/S/SexHormones.html |
Appendix C – Web Sites for Course

Websites to help throughout the course:

1. [www.getbodysmart.com](http://www.getbodysmart.com)
   An online examination of human anatomy and physiology. Visually Learn About the Human Body Using Our Interactive "Flash" Animations

2. [http://library.thinkquest.org/2935/Natures_Best/Nat_Best_High_Level/Page_Shells/Muscular_Shell.html](http://library.thinkquest.org/2935/Natures_Best/Nat_Best_High_Level/Page_Shells/Muscular_Shell.html)
   This website is aimed for high school students and has many graphics with explanations for many body systems.

   Several resources…lesson plans, worksheets, activities etc. (organized by body system)

   This site has self tests, quizzes and games that students can use for practice.


   This shows 3D interactive images of the human body.

7. [http://academic.pgcc.edu/~aimholtz/AandP/AandPLinks/ANPlinks.html](http://academic.pgcc.edu/~aimholtz/AandP/AandPLinks/ANPlinks.html)
   This site is intended for college students but there are some great resources that could be utilized by high school students.

Web Resources by Chapter:

Chp 1: The Human Body: An Orientation
- On-line activity related to relative body position.  
- On-line activity exploring health careers.  

Chp 2: Basic Chemistry
- Enzyme Lab Activity that uses items found at the grocery store.  
- Great worksheet to introduce/reinforce macromolecules.  

Chp 3: Cells & Tissues
- Great way to review cells on-line.  

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Appendix C – Web Sites for Course

- Cell organelles concept map.  
  http://www.biologycorner.com/anatomy/cell/cell_conceptmap.html

- On-line tissue identification lab.  (alternative to using microscopes to view tissue slides)  
  http://www.biologycorner.com/anatomy/cell/cell_conceptmap.html

Chapter 4: Skin & Body Membranes
- On page 16 of this document there are directions for building a skin model using food.  

Chp 5: Skeletal System
- “The Mystery of Bones” Webquest that integrates forensic anthropology with learning the skeletal system.  

- This is a cut out of the skeletal system.  The students build their own paper skeleton.  Student handout: http://science-class.net/Lessons/Anatomy/Support/dem_bones.pdf
  Bone cut out: http://science-class.net/Lessons/Anatomy/Support/dembonestemplate.pdf

Chp 6: The Muscular System
- This site has several diagrams of muscle groups.  Rolling over each muscle highlights and gives the name.  Students can then quiz themselves on each group.  
  http://www.gwc.maricopa.edu/class/bio201/muscle/mustut.htm

- This site has a couple of good and simple ideas for helping students memorize muscles and their functions.  
  http://www.livestrong.com/article/366986-activities-for-teaching-muscular-system/

Chp 7: The Nervous System
- This site contains 3 activities that can be used to cover aspects of the nervous system.  They are advanced but could be differentiated easily.  
  http://biology.arizona.edu/sciconn/lessons2/renfro/intro.htm

- This site contains an activity involving the effects of environment on memory.  


Chp 8: Special Senses
- This uses jellybeans to help students explore the relationship between sight, smell and taste.  
  Teacher guide: http://serendip.brynmawr.edu/sci_edu/waldron/pdf/SensesTeachPrep.pdf

Chp 9: The Endocrine System
- This site offers several quizzes dealing with the endocrine system.  
  http://www.funtrivia.com/quizzes/sci__tech/human_body/endocrine_system.html

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Appendix C – Web Sites for Course

Chp 10: Blood
- This lab combines blood typing with a genetics lesson and a “crime scene.”
  - Student guide:
    http://serendip.brynmawr.edu/sci_edu/waldron/pdf/BloodTypeGeneticsProtocol.pdf
  - Teacher guide:
    http://serendip.brynmawr.edu/sci_edu/waldron/pdf/BloodTypeGeneticsTeachPrep.pdf

Chp 11: The Cardiovascular System
- This is a sheep heart dissection guide.
- Another sheep heart guide.
  http://www.biologycorner.com/anatomy/circulatory/heart/heart_dissection.html
- Drag and drop heart diagrams (requires a computer):
- This site has several ideas that can be adapted for high school students:
  http://www.discoveryeducation.com/teachers/free-lesson-plans/heres-to-your-healthy-heart.cfm
- This site gives pictures of various ECG’s: http://www.ecglibrary.com/ecghome.html

Chp 12: The Lymphatic System & Body Defenses
- A fun way to truly access if students understand the way the immune system works. Instead of acting their skits live you can have them use flip cameras to video and edit.
  http://www.discoveryeducation.com/teachers/free-lesson-plans/operation-antibody.cfm

Chp 13: The Respiratory System
- This site has a lab that test vital capacity in a unique way.
- This site has an animation of how the lungs work.
  http://www.nhlbi.nih.gov/health/dci/animate/howlungswork.swf
- This activity measures lung capacity by using a balloon. http://science-class.net/Lessons/Anatomy/Respiratory/lung%20capacity.pdf

Chp 14: The Digestive System and Body Metabolism
- This site has 6 activities that will allow the students to visualize the parts of the digestive system process. http://mypages.iit.edu/~smile/bi9706.html
- This site also has several activities for digestion.

Chp 15: The Urinary System
Appendix C – Web Sites for Course

- This site has a tutorial for the urinary system.
- I use a lab by neosience called Kidney Function lab. It uses dialysis tubing and simulated blood. Here is the link for the kit. Very good visual that doesn’t take a whole lot of time.
  http://www.neosci.com/catalog.asp?sid=237074852&showID=134&content=cn_showitem

Chp 16: The Reproductive System
- This is a ppt that covers the basics plus. You must preview this before you show it. There may be some things on it that you are not comfortable discussing.
  https://docs.google.com/present/view?id=dfh23k67_961gkfkfchr

Dissection Resources on the Web

**Pig**
- http://faculty.clintoncc.suny.edu/faculty/michael.gregory/files/bio%20102/bio%20102%20labor atory/fetal%20pig/fetal%20pig.htm

**Cat**

**Brain**
- http://psych.hanover.edu/classes/neuropsychology/Syllabus/Labs/DISSECTION.pdf

**Heart**
- http://www.hometrainingtools.com/heart-dissection-project/a/1318/
Title of Lesson: Autopsy of a Dill Pickle (practice using anatomical directional terms) First Quarter

NGSSS (Number and Benchmark):

SC.912.N.1.2 Describe and explain what characterizes science and its methods;

Materials Needed:

scalpel, forceps, dissecting pans, dissecting pins, scissors, teasing needle, blunt probe, dropper, pH paper, microscope, aprons, goggles

Safety Concerns/Issues:

Students need to observe safety procedures when dealing with dissecting equipment.

Procedures: See next page

Assessment of Student Learning:

Lab sheet

Teacher Reflection: This is a great way for students to practice their knowledge of directional terms. This is done very early in the semester so it also reintroduces them to several pieces of lab equipment; as well as, microscopes.

Adapted by A. Ainslie from www.biologycorner.com
Appendix D
Labs and Activities From Within the Map – By Quarters

**Autopsy of a Dill Pickle**
Performed by Dr. ______________________, coroner, on this day of ____________, 200__.

**Tools**
1. Scalpel
2. Forceps
3. Dissecting pan
4. Dissecting pins
5. Scissors
6. Teasing needles
7. Blunt probe
8. Dropper

**Stage One**
The exterior of the body is examined for abnormalities such as wounds or scars from injuries or surgeries. **Draw** both dorsal and ventral views of your pickle, indicating your findings. **Label** the views.

**Stage Two**
The ventral body cavity (A) is opened by a deep Y-shaped incision (B). The arms of the Y start at the anterior surface of the shoulders (C) and join at the inferior point of the breastbone (sternum) (D) to form a single cut that extends to the pubic area (E). **Draw** the pickle and the line of incision. **Label** A-E.
Appendix D  
Labs and Activities From Within the Map – By Quarters

After the ribcage is sawn through, the abdominopelvic region (F) can be opened like hinged doors (G) to expose the internal organs (H). The contents of the thoracic cavity (I) will also be visible. The second stage of the autopsy includes careful examination of many or all of the internal organs. If the brain is to be examined, a portion of the skull must be removed. The face, arms and legs are usually not dissected unless there is a specific reason for doing so. Draw the pickle at this stage of the autopsy. Label the F-I. Indicate superficial and deep layers. Make enlarged drawings of at least 2 organs.

Stage Three
After the organs are returned to their respective body cavities, and the body is sewn up, the third phase of the autopsy begins. It is a microscopic examination of tissues collected during the first two stages. Tests to analyze the chemical content of body fluids or to determine the presence of infections organisms may also be performed. Examine a thin slice of pickle tissue under the microscope (be sure to use a cover slip!) Draw the microscopic structure of the tissue sample.
Appendix D
Labs and Activities From Within the Map – By Quarters

Collect a sample of body fluid using the dropper. Test the pH of the body fluid using pH test paper. pH = _____________ Is the body fluid acidic, basic or neutral? ________________
Normal pH of human body tissues is 7.35-7.45.

**Conclusion:**
What is your finding about the cause of death of this patient? Support your opinions with specific details from the autopsy.
Appendix D
Labs and Activities From Within the Map – By Quarters

Title of Lesson:  Cell Lab - Prepared slides of cheek cell! First Quarter

NGSSS (Number and Benchmark):

SC. 912.N.1.1 Define a problem based on a specific body of knowledge, for example;

SC.912.L.14.2 Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive & active).

Materials Needed:

Prepared slides of cheek cells (simple squamous epithelial), microscopes

Safety Concerns/Issues:

Students should use caution when handling glass slides and microscopes.

Procedures:  See the following pages for directions

Assessment of Student Learning:

Analysis questions and lab sheet

Teacher Reflection:

Very simple lab that can be used with all levels of students.

Adapted by A. Ainslie from www.biologycorner.com
Appendix D
Labs and Activities From Within the Map – By Quarters

Name _____________________

The Human Cheek Cell - Prepared slides

Procedure:
1. Obtain a **prepared human cheek cell slide**. It may be labeled “simple squamous.”
2. Use the low objective to focus. You probably will not see the cells at this power.
3. Switch to medium power. Cells should be visible, but they will be small and look like nearly clear pinkish-purplish blobs.
4. Once you think you have located a cell, switch to high power and refocus. (Remember; do NOT use the coarse adjustment knob at this point)
   --- **Sketch** the cell at medium and high power. Label the nucleus, cytoplasm, and cell membrane. Draw your cells to scale.

QUESTIONS

1. The cells have been stained pink and purple. Why is it necessary to stain the cheek cells?
2. The light microscope used in the lab is not powerful enough to view other organelles in the cheek cell. What parts of the cell were visible?
3. List 2 organelles that were NOT visible but should have been in the cheek cell.
4. Keeping in mind that the mouth is the first site of chemical digestion in a human. Your saliva starts the process of breaking down the food you eat. Keeping this in mind, what organelle do you think would be numerous inside the cells of your mouth?
Title of Lesson: Give Me Some Skin Man (skin disease pamphlet)  
First Quarter

NGSSS (Number and Benchmark):

HE.912.C.1.3 Evaluate how environmental and personal health are interrelated;
LA.910.4.2.2 The student will record information and ideas from primary and/or secondary sources accurately and coherently, noting the validity and reliability of these sources and attributing sources of information;
SC.912.L.14.51 Describe the function of the vertebrate integumentary system

Materials Needed:

Internet or resource books, construction or colored copy paper, examples of real pamphlets from doctor’s office

Safety Concerns/Issues: None

Procedures: See next page

Assessment of Student Learning:

Finish project can be assessed using a rubric

Teacher Reflection:

This activity is open ended so that all level of students can complete this assignment successfully. You may need to give lower level students a list of skin diseases to pick from.

Created by D. Ziebart and A. Ainslie
Give me some skin man…

Here’s another opportunity for you to get an awesome grade doing something fun! You are going to design a skin awareness pamphlet. Here is what you need to do…

1. Pick a disease of the skin that YOU think is interesting

2. Research the disease and make a pamphlet informing people about the problems of the disease.

3. You need to have the following parts…
   a. Tri-fold pamphlet
   b. A title
   c. Diagram of the skin (labeled) OR the accessory structure that your disease effects
   d. Describe the disease and its symptoms
   e. Tell what part of the Integumentary system your disease effects
   f. Tell how you can get the disease
   g. Tell how it is treated and whether or not there is a cure

4. You may use books, magazines, the Internet, etc to find your information

5. Add a picture of your disease and you get extra credit!

6. Treat this like a pamphlet the public is going to read…don’t get too technical!

7. Be creative…people are more likely to read an interesting and informative pamphlet!
Title of Lesson: Makin' Muscles Second Quarter

NGSSS (Number and Benchmark):

SC.912.L14.16: Describe the anatomy and histology, including ultrastructure, of muscle tissue

Materials Needed:

Craft Supplies: cups, plastic wrap, pipe cleaners, tooth picks, etc. (this can also be done with clay)

Safety Concerns/Issues: None

Procedures:
Students create a muscle that includes a cross section to show the various parts. They should include the following...Epimysium, Perimysium, Endomysium, fascicle, fiber, myofibril, tendon. If it is not possible from them to label the parts then they should provide a key.

Assessment of Student Learning:
Finish project can be assessed using a rubric.

Teacher Reflection:
This project is a great way to get all of the students involved. Any level of student can work on this project. I enjoy seeing how creative the students can be with this task.

Created by A. Ainslie
Title of Lesson: The Skeletal Challenge  Second Quarter

NGSSS (Number and Benchmark):

SC.912.L.14.14 Identify the major bones of the axial and appendicular skeleton

Materials Needed:
Cardstock, or a piece of cardboard for a backing, toothpicks, clay

Safety Concerns/Issues: None

Procedures:
See next page

Assessment of Student Learning:

Finish project can be assessed using a rubric.

Teacher Reflection:
This project allows students to demonstrate what they know in a non-threatening way.

Created by A. Ainslie
Appendix D
Labs and Activities From Within the Map – By Quarters

The Skeletal Challenge
You and your partner are about to embark in an interesting adventure. You are going to build a skeleton with the following materials...toothpicks and clay. The bones you are to include are listed below. The only rules are
1. You must lay your skeleton on a piece of cardstock.
2. You must have all of the bones labeled.
3. Here’s the catch: You are your partner cannot communicate verbally with each other AT ALL. If you are found talking, then points will be deducted from your grade. You will have 1 minute to formulate a quick plan of action and then you will not be able to talk.

**Take your time and get the bones labeled correctly. When you are finished, raise your hand and I will come and check your work.

Bones to be included:

<table>
<thead>
<tr>
<th>Clavicle</th>
<th>scapula</th>
<th>humerus</th>
<th>ulna</th>
<th>radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phalanges (both)</td>
<td>sternum</td>
<td>pelvic girdle</td>
<td>femur</td>
<td>fibula</td>
</tr>
<tr>
<td>Tibia</td>
<td>patella</td>
<td>sacrum</td>
<td></td>
<td>vertebral column</td>
</tr>
<tr>
<td>Coccyx</td>
<td>true ribs</td>
<td>false ribs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix D
Labs and Activities From Within the Map – By Quarters

Title of Lesson: You are the Doctor (endocrine project)
Third Quarter

NGSSS (Number and Benchmark):
SC.912.L.14.30 Compare endocrine and neural controls of physiology;
LA.910.4.2.2 The student will record information and ideas from primary and/or secondary sources accurately and coherently, noting the validity and reliability of these sources and attributing sources of information

Materials Needed: Internet access or resource books

Safety Concerns/Issues: None

Procedures See Below

Assessment of Student Learning: A Rubric can be used to easily assess this project.

Teacher Reflection: This is a great activity for students to use their creativity.

You are the Doctor!
Congratulations, you are going to be a doctor for a few days. You have just discovered that one of your patients has the following disorder___________________________.
You have to act fast. You need to research the disorder and come up with a treatment plan. Some disorders have been extensively studied others have not. Do the best you can. You will have to present your findings at a Medical Conference because your work will be considered a revolutionary breakthrough in modern medicine.
Here are the details:
1. Look up the disorder on the Internet or find a book in the library.
2. Find out the name of the gland that is the SOURCE of the hormone.
   Include the name(s) of the hormone(s) that gland produces which cause the disease or response.
3. Tell about the causes, risk factors, prevention and symptoms of the disorder.
4. Finally, tell in your opinion as the “Doctor” what would be the most effective for of treatment.
5. Create a pamphlet, cartoon, song, poster …. to highlight your findings.
   Be creative!!!! This will be presented at the “medical conference: in front of your peers. Keep it short and specific. (3 minutes or less!)
6. Remember I said fast…. 2 days or the patient is suing!!!!
Title of Lesson: Dracula’s Dilemma (Blood compatibility lab) Third Quarter

NGSSS (Number and Benchmark):
SC. 912.N.1.1 Define a problem based on a specific body of knowledge;
SC.912.L.14.35 Describe the steps in hemostasis, including the mechanism of coagulation. Include. Include the basis for blood typing and transfusion reactions.

Materials Needed:
12 glass containers, red food coloring, blue food coloring, water, and marker

Safety Concerns/Issues: Food coloring can stain skin and clothing

Procedures: See next page

Assessment of Student Learning: Lab Sheet

Teacher Reflection: This lab gives students a visual guide to the basic compatibility of blood types.

Adapted by A. Ainslie from www.biologycorner.com.
Appendix D
Labs and Activities From Within the Map – By Quarters

Dracula’s Dilemma...

Dracula heard that transfusions of the wrong blood could cause serious problems and even death. He knew that for any transfusion it was always best to match the blood types of the donor exactly. However, he heard that for some small transfusions the blood types of the donor and patient did not have to match exactly. Dracula wants to find out the possible combinations of blood types that will be safe for small transfusions. You can help him out by doing the following activity.

Materials:
12 glass containers, red food coloring, blue food coloring, water, and marker

A. Fill each container half full with water.
B. To each of the first three containers adds few drops of red food coloring and stir. If the solution is not a bright red color, add a couple more drops of food coloring. These three containers will represent type A blood. Initial each of these containers with the letter A.
C. Repeat step B for the next three containers, this time using blue food coloring. Label these containers with a B for type B blood. Note all blood is the same color.
D. To each of the next three containers add a few drops of red and a few drops of blue food coloring. Label these glasses AB they AB blood.
E. Do not add any food coloring to the last three containers. Label each of these containers with an O for type O blood.
F. You will pour about ¼ of the liquid from on container of each blood type into one container of each of the other blood types. This will represent a transfusion. If the liquid changes color, the transfusion is not safe. Record the results by writing Safe (S) or Unsafe (US) in the Tables 1-1 and 1-2.

Notice that part of the tables have been filled in for you; since it is always safe to mix the same blood types, it is not necessary to do transfusions of same blood types. There are other parts of the tables that you will fill in without doing the transfusion. For example, any blood type added to O will cause a color change. Therefore, O blood can only receive blood from another type O person. Record this in the tables.

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>O</th>
<th>A</th>
<th>B</th>
<th>AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1-1 Giving Blood

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>O</th>
<th>A</th>
<th>B</th>
<th>AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>S</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Revised 6/2011
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<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>S</th>
<th></th>
<th>A</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>S</td>
<td></td>
<td>AB</td>
<td>S</td>
<td></td>
</tr>
</tbody>
</table>

S = Safe

G. Start Your Transfusions! Use Table 1-3 as your guide in making your transfusions.

Transfusion from one container of …To one container or
1. A  B, AB
2. B  A, AB
3. AB A, AB

After each transfusion, set the glass aside and do not use it again.

H. Now that you have completed tables 1-1 and 1-2, summarize your results for Dracula using Table 1-3.

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>Can act as donor to type</th>
<th>Can receive blood from type</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I. Dracula heard that “O” type blood was called the universal donor, and AB type blood was called the “universal recipient” or universal receiver. So you need to help him out.

1. What does universal donor mean?
2. Why is type O the universal donor?
3. What does universal recipient mean?
4. Why is type AB blood the universal recipient?
5. What type of blood should be used in large transfusions?
Title of Lesson: Respiratory models
Fourth Quarter

NGSSS (Number and 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

Materials Needed: play doh or clay

Safety Concerns/Issues: none

Procedures: See below

Assessment of Student Learning: Accuracy of labeled anatomical structures.

Teacher Reflection: Lower level students need a list of structures that should be included. Models can be 2D (flat) or 3D.

Created by A. Ainslie

Respiratory Model Directions

Use the play doh and clay to make a model of the pathway an O2 molecule would travel.

I would expect to see you begin with the nose and end with the alveoli. You will not have time to add every little part but should include the major parts. You will have a limited amount of class time so work quickly and efficiently. Be sure to label the parts. You will get points based on accuracy and correct flow of oxygen.