

# Syllabus

## 6th-Science

### August 1 – August 19 – Weeks 1-3 – Scientific Method

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0607.Inq.1</b> Design a simple experimental procedure with an identified control and appropriate variables.</p>	<p>I can design and conduct an investigation which demonstrates experimental design, including an identified independent variable, dependent variable, and control.</p>	<p>Students will investigate the interdependence of organisms in major biomes. * this assignment may be given at any time during this 9 weeks</p>
<p><b>SPI 0607.Inq.2</b> Select tools and procedures needed to conduct a moderately complex experiment.</p>	<p>I can identify and use appropriate lab tools/techniques to gather, organize data from an investigation.</p>	
<p><b>SPI 0607.Inq.3</b> Interpret and translate data into a table, graph, or diagram.</p>	<p>I can analyze and interpret data in various forms, such as: forming a conclusion, identifying cause and effect relationships, determining if the data are sufficient to support a given claim, identifying patterns/trends among the data.</p>	
<p><b>SPI 0607.Inq.4</b> Draw a conclusion that establishes a cause and effect relationship supported by evidence.</p>	<p>I can communicate scientific understanding using models, descriptions, explanations or data in various forms.</p>	
<p><b>SPI 0607.Inq.5</b> Identify a faulty interpretation of data that is due to bias or experimental error.</p>	<p>I can review an experimental design or scientific literature to determine possible sources of bias or error, state alternative explanations and identify questions for further investigation.</p>	

**August 22 - 26 – Week 4 – Ecology**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<b>SPI 0607.2.1</b> Classify organisms as producers, consumers, scavengers, or decomposers according to their role in a food chain or food web.	I can classify organisms as producers, consumers, scavengers, or decomposers if given their role in a food chain or food web.	

**August 29 – September 9 – Week 5 - 6 – Ecology**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<b>SPI 0607.2.2</b> Interpret how materials and energy are transferred through an ecosystem.	I can diagram and describe the flow of matter and energy through the biotic and abiotic components of an ecosystem, using the terms producers, consumers (primary, secondary, tertiary) and decomposers. I can evaluate the impact of an increase or loss of a species on a food web. I can model an energy pyramid.	

**September 12 – September 30 – Weeks 7-9 – Ecology**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<b>SPI 0607.2.3</b> Identify the biotic and abiotic elements of the major biomes.	I can identify two factors that define a biome: climate and latitude. I can compare and contrast the biotic and abiotic elements of each major biome. I can research and explain using data from the major biomes. I can interpret a climatogram of a biome. I can examine and model interactions between the abiotic and biotic elements of a given biome.	

<p><b>SPI 0607.2.4</b> Identify the environmental conditions and interdependencies among organisms found in the major biomes.</p>	<p>I can model and explain levels of ecological organization: organism, population, community, ecosystem, biome, and biosphere.</p>	
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**October 17 - 28 – Weeks 1-2 (2<sup>nd</sup> 9 weeks) – Universe**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0607.6.1</b> Use data to draw conclusions about the major components of the universe.</p> <p><b>SPI 0607.6.2</b> Explain how the relative distance of objects from the earth affects how they appear.</p>	<p>I can analyze information about major components of the universe.</p> <p>I can describe the relative distance of objects in the solar system from earth.</p>	<p>Students will investigate the relationship of objects in the universe.</p> <p>* this assignment may be given at any time during this 9 weeks</p>

**October 31 – December 2 – Week 3 – 7 (2<sup>nd</sup> 9 weeks) – Earth-Sun-Moon Relationship**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0607.6.3</b> Distinguish among a day, lunar cycle, and year based on the movements of the earth, sun, and moon.</p>	<p>I can explain how the positional relationships among the earth, moon, and sun control the length of the day, lunar cycle, and year.</p> <p>I can describe the different stages in the lunar cycle.</p>	

**December 5 - 16 – Weeks 8 – 9 (2<sup>nd</sup> 9 weeks) – Earth-Sun-Moon Relationship**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<b>SPI 0607.6.5</b> Predict the types of tides that occur when the earth and moon occupy various positions.	I can demonstrate how the moon produces tides.	

**January 3 - 20 – Weeks 1-3 (3<sup>rd</sup> 9 weeks) – Earth-Sun-Moon Relationship**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<b>SPI 0607.6.6</b> Use a diagram that shows the positions of the earth and sun to explain the four seasons and eclipses.	I can illustrate the relationship between the seasons and the earth-sun-system. I can compare and contrast the causes of lunar and solar eclipses.	

**January 23 – February 10 – Weeks 4-6 (3<sup>rd</sup> 9 weeks) – Convection in Atmosphere and Oceans**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<b>SPI 0607.8.1</b> Analyze data to identify events associated with heat convection in the atmosphere.	I can illustrate how thermal energy is transferred air and liquids.	Students will demonstrate how convection drives atmospheric and/or oceanic conditions. * this assignment may be given at any time during this 9 weeks
<b>SPI 0607.8.2</b> Recognize the connection between the sun’s energy and the wind.	I can determine how the sun drives atmospheric convection.	
<b>SPI 0607.8.3</b> Describe how temperature differences in the ocean account for currents.	I can investigate the relationship between currents and oceanic temperature differences.	

**February 13 – February 24 – Weeks 7-8 – Weather**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<b>SPI 0607.8.4</b> Interpret meteorological data		

make predictions about the weather.	I can analyze meteorological data to predict weather conditions.	
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**February 27 – March 15 – Weeks 9 (3<sup>rd</sup> 9 weeks) & Weeks 1-2 (4<sup>th</sup> 9 weeks) – Energy**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0607.10.1</b> Distinguish among gravitational potential energy, elastic potential energy, and chemical potential energy.</p> <p><b>SPI 0607.10.2</b> Interpret the relationship between potential and kinetic energy.</p> <p><b>SPI 0607.10.3</b> Recognize that energy can be transformed from one type to another.</p> <p><b>SPI 0607.10.4</b> Explain the Law of Conservation of Energy using data from a variety of energy transformations.</p>	<p>I can compare and contrast the different forms of potential energy.</p> <p>I can analyze various types of energy transformations.</p> <p>I can explain the principles underlying the Law of Conservation of Energy.</p>	<p>Students will model the transfer of energy through simple circuits.</p>

**March 27 – April 7 – Weeks 3-4 – Electricity**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0607.12.1</b> Identify how simple circuits are associated with the transfer of electrical energy when heat, light, sound, and chemical changes are produced.</p> <p><b>SPI 0607.12.2</b> Identify materials that can conduct electricity.</p>	<p>I can describe how simple circuits are associated with the transfer of electrical energy.</p> <p>I can explain how simple electrical circuits can be used to determine which materials conduct electricity.</p>	

**Dates from current calendar – Weeks to cover topic – Topic covered**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
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<p><b>SPI 0607.T/E.1</b> Identify the tools and procedures needed to test the design features of a prototype.</p> <p><b>SPI 0607.T/E.2</b> Evaluate a protocol to determine if the engineering design process was successfully applied.</p> <p><b>SPI 0607.T/E.3</b> Distinguish between the intended benefits and the unintended consequences of a new technology.</p> <p><b>SPI 0607.T/E.4</b> Differentiate between adaptive and assistive bioengineered products (e.g., food, biofuels, medicines, integrated pest management).</p>	<p>I can explore how technology responds to social, political, and economic needs.</p> <p>I can understand that the engineering design process involves an ongoing series of events that incorporate design constraints, model building, testing, evaluating, modifying, and retesting.</p> <p>I can compare the intended benefits with the unintended consequences of a new technology.</p> <p>I can describe and explain the differences adaptive and assistive bioengineered products.</p>	<p>These standards will be incorporated within lessons throughout the school year.</p>
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# Syllabus

## 7<sup>th</sup> Grade- Science 1<sup>st</sup> 9 Weeks

### 8/1-8/12 – Week 1 & 2– Lab Safety/ Inquiry and Technology

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>Teacher Based: Practices and procedures for setting up the year in the classroom.</li> <li>7.1.1- Design a simple experimental procedure with an identified control and appropriate variables.</li> <li>7.1.2- Select tools and procedures needed to conduct a moderately complex experiment.</li> <li>7.1.4- Draw a conclusion that establishes a cause and effect relationship supported evidence.</li> <li>7.1.5- Identify a faulty interpretation of data that is due to bias or experimental error.</li> </ul>	<p><b>I can.....</b></p> <ul style="list-style-type: none"> <li>Demonstrate knowledge of classroom procedures and lab safety methods.</li> <li>Define procedure, control group, experimental group, variable, independent variable, and control variable.</li> <li>Select the correct laboratory tool to make a measurement or observation.</li> <li>Identify a data table, line graph, bar graph, and circle graph.</li> <li>Identify examples of experimental error.</li> </ul>	<ul style="list-style-type: none"> <li>Introduction reflective writing.</li> <li>Lab detailing variables.</li> <li>Lab safety and equipment assessment.</li> </ul>

### 8/15-8/19 – Week 3 – Cause and Effect/ Adaptive and Assistive Technology

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.1.3- Interpret and translate data into a table, graph, or diagram.</li> <li>7.T/E.4- Differentiate between adaptive and assistive engineered products.</li> </ul>	<p><b>I can....</b></p> <ul style="list-style-type: none"> <li>Identify that the independent variable is the cause and the dependent variable is the effect in the experiment.</li> <li>Determine how the dependent variable changes as the independent variable is changed.</li> </ul>	<ul style="list-style-type: none"> <li>Lab detailing variables.</li> <li>Design, create, or modify an assistive or adaptive engineering product.</li> <li>Summative assessment: Weeks 1-3.</li> </ul>

	<ul style="list-style-type: none"> <li>Define bioengineering, assistive bioengineering, and adaptive engineering.</li> <li>Explain the difference between assistive and adaptive engineering.</li> </ul>	
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### 8/22-8/26 – Week 4 – Simple Machines

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.11.1- Differentiate between the six simple machines.</li> </ul>	<b>I can....</b> <ul style="list-style-type: none"> <li>Define work, force, simple machine, incline plane, wedge, screw, lever, fulcrum, wheel and axle, and pulley.</li> <li>Identify examples of each type of simple machine in my daily life.</li> </ul>	<ul style="list-style-type: none"> <li>Design Rube Goldberg machine.</li> </ul>

### 8/29-9/2 – Week 5 – Work, Force, Distance

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.11.2- Determine the amount of force needed to do work using different simple machines.</li> </ul>	<b>I can....</b> <ul style="list-style-type: none"> <li>Recognize that <math>\text{work} = \text{force} \times \text{distance}</math> or <math>\text{force} = \text{work}/\text{distance}</math>.</li> <li>Define work, force, and distance.</li> </ul>	<ul style="list-style-type: none"> <li>Work, force, distance lab.</li> <li>Summative Assessment: Weeks 4 &amp; 5</li> </ul>

### 9/5-9/16 – Week 6 & 7 – Newton's Laws

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.11.4- Identify and explain how Newton's laws of motion relate to the movement of objects.</li> </ul>	<b>I can....</b> <ul style="list-style-type: none"> <li>Define force, net force, balance forces, unbalanced forces, inertia, mass, friction, and acceleration.</li> </ul>	<ul style="list-style-type: none"> <li>Mini-Labs over each of Newton's 3 Laws of Motion.</li> <li>Summative Assessment: Weeks 6 &amp; 7</li> </ul>

	<ul style="list-style-type: none"> <li>• Give examples from my daily life of Newton's 3 Laws of Motion.</li> <li>• Know what causes objects to move differently under different circumstances.</li> </ul>	
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**9/19-9/30– Weeks 8 & 9 – Speed, Distance, Time/ Waves**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>• 7.11.3- Apply proper equations to solve basic problems pertaining to distance, time, and speed.</li> <li>• 7.11.5- Compare and contrast the different parts of a wave.</li> </ul>	<p><b>I can....</b></p> <ul style="list-style-type: none"> <li>• Define motion, distance, rate, speed, and velocity.</li> <li>• Describe the key difference between speed and velocity.</li> <li>• Recognize that speed=distance/time.</li> <li>• Define wave, amplitude, crest, trough, wavelength, resting position, transverse wave, longitudinal wave, compression, and rarefaction.</li> <li>• Label the parts of a transverse and longitudinal wave.</li> </ul>	<ul style="list-style-type: none"> <li>• Mini-Labs for S/D/T</li> <li>• Mini-Labs for waves</li> <li>• Summative Assessment: Weeks 8 &amp; 9.</li> </ul>

# Syllabus

## 7<sup>th</sup> Grade- Science 2<sup>nd</sup> 9 Weeks

### 10/17-11/4 – Weeks 1-3 – Cells/Levels of Organization

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.1.1- Identify and describe the function of major plant and animal cells.</li> <li>7.1.2- Interpret a chart to explain the integrated relationships that exist among cells, tissues, organ, and organ systems.</li> </ul>	<b>I can....</b> <ul style="list-style-type: none"> <li>Recognize the parts and functions of animal and plant cells.</li> <li>Define cell, prokaryotic, eukaryotic, organelle, cytoplasm, and nucleus.</li> <li>Create a venn diagram to compare plant and animal cells.</li> <li>Create a flow chart that shows the relationship between cells, tissues, organs, organ systems, and organisms.</li> </ul>	<ul style="list-style-type: none"> <li>Venn Diagram comparing plant and animal cells.</li> <li>Draw, color, and label plant and animal cell.</li> <li>Create a model of a cell.</li> <li>Cell Campaign project.</li> <li>Summative assessment: Weeks 1-3</li> </ul>

### 11/7-11/18 – Weeks 4 & 5 – Organ Systems

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.1.3- Explain the basic function of a major organ system</li> </ul>	<b>I can....</b> <ul style="list-style-type: none"> <li>Identify the 11 organ systems in the human body.</li> <li>Describe the main functions of each organ system.</li> </ul>	<ul style="list-style-type: none"> <li>Group research presentation.</li> <li>Matching of organ systems and functions.</li> <li>Summative assessment: Weeks 4 &amp; 5</li> </ul>

**11/21-12/2 – Weeks 6 & 7 – Osmosis and Diffusion**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.1.5- Explain how materials move through simple diffusion.</li> </ul>	<p><b>I can....</b></p> <ul style="list-style-type: none"> <li>Define diffusion, osmosis, semi-permeable, permeable, and equilibrium.</li> <li>Identify examples of diffusion in everyday life.</li> <li>Describe the difference between diffusion and osmosis.</li> <li>Explain why particles move from high concentration to low concentration.</li> </ul>	<ul style="list-style-type: none"> <li>Labs for diffusion and osmosis.</li> <li>Egg osmosis</li> <li>Summative assessment: Weeks 6 &amp; 7</li> </ul>

**12/5-12/16 – Weeks 8 & 9 – Photosynthesis and Cellular Respiration**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.3.1- Compare the chemical compounds that make up the reactants and products of photosynthesis and cellular respiration.</li> </ul>	<p><b>I can....</b></p> <ul style="list-style-type: none"> <li>Define reactant, product, photosynthesis, and cellular respiration.</li> <li>Identify reactants and products for photosynthesis and cellular respiration.</li> </ul>	<ul style="list-style-type: none"> <li>Create a diagram showing the relationship for photosynthesis and cellular respiration.</li> <li>Poem, Song, or cartoon depicting photosynthesis/cellular respiration.</li> <li>Summative Assessment: weeks 8 &amp; 9.</li> </ul>

# Syllabus

## 7<sup>th</sup> Grade- Science 1<sup>st</sup> 9 Weeks

### 8/1-8/12 – Week 1 & 2– Lab Safety/ Inquiry and Technology

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>Teacher Based: Practices and procedures for setting up the year in the classroom.</li> <li>7.1.1- Design a simple experimental procedure with an identified control and appropriate variables.</li> <li>7.1.2- Select tools and procedures needed to conduct a moderately complex experiment.</li> <li>7.1.4- Draw a conclusion that establishes a cause and effect relationship supported evidence.</li> <li>7.1.5- Identify a faulty interpretation of data that is due to bias or experimental error.</li> </ul>	<p><b>I can.....</b></p> <ul style="list-style-type: none"> <li>Demonstrate knowledge of classroom procedures and lab safety methods.</li> <li>Define procedure, control group, experimental group, variable, independent variable, and control variable.</li> <li>Select the correct laboratory tool to make a measurement or observation.</li> <li>Identify a data table, line graph, bar graph, and circle graph.</li> <li>Identify examples of experimental error.</li> </ul>	<ul style="list-style-type: none"> <li>Introduction reflective writing.</li> <li>Lab detailing variables.</li> <li>Lab safety and equipment assessment.</li> </ul>

### 8/15-8/19 – Week 3 – Cause and Effect/ Adaptive and Assistive Technology

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.1.3- Interpret and translate data into a table, graph, or diagram.</li> <li>7.T/E.4- Differentiate between adaptive and assistive engineered products.</li> </ul>	<p><b>I can....</b></p> <ul style="list-style-type: none"> <li>Identify that the independent variable is the cause and the dependent variable is the effect in the experiment.</li> <li>Determine how the dependent variable changes as the independent variable is changed.</li> </ul>	<ul style="list-style-type: none"> <li>Lab detailing variables.</li> <li>Design, create, or modify an assistive or adaptive engineering product.</li> <li>Summative assessment: Weeks 1-3.</li> </ul>

	<ul style="list-style-type: none"> <li>Define bioengineering, assistive bioengineering, and adaptive engineering.</li> <li>Explain the difference between assistive and adaptive engineering.</li> </ul>	
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### 8/22-8/26 – Week 4 – Simple Machines

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.11.1- Differentiate between the six simple machines.</li> </ul>	<b>I can....</b> <ul style="list-style-type: none"> <li>Define work, force, simple machine, incline plane, wedge, screw, lever, fulcrum, wheel and axle, and pulley.</li> <li>Identify examples of each type of simple machine in my daily life.</li> </ul>	<ul style="list-style-type: none"> <li>Design Rube Goldberg machine.</li> </ul>

### 8/29-9/2 – Week 5 – Work, Force, Distance

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.11.2- Determine the amount of force needed to do work using different simple machines.</li> </ul>	<b>I can....</b> <ul style="list-style-type: none"> <li>Recognize that <math>\text{work} = \text{force} \times \text{distance}</math> or <math>\text{force} = \text{work}/\text{distance}</math>.</li> <li>Define work, force, and distance.</li> </ul>	<ul style="list-style-type: none"> <li>Work, force, distance lab.</li> <li>Summative Assessment: Weeks 4 &amp; 5</li> </ul>

### 9/5-9/16 – Week 6 & 7 – Newton's Laws

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.11.4- Identify and explain how Newton's laws of motion relate to the movement of objects.</li> </ul>	<b>I can....</b> <ul style="list-style-type: none"> <li>Define force, net force, balance forces, unbalanced forces, inertia, mass, friction, and acceleration.</li> </ul>	<ul style="list-style-type: none"> <li>Mini-Labs over each of Newton's 3 Laws of Motion.</li> <li>Summative Assessment: Weeks 6 &amp; 7</li> </ul>

	<ul style="list-style-type: none"> <li>• Give examples from my daily life of Newton's 3 Laws of Motion.</li> <li>• Know what causes objects to move differently under different circumstances.</li> </ul>	
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**9/19-9/30– Weeks 8 & 9 – Speed, Distance, Time/ Waves**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>• 7.11.3- Apply proper equations to solve basic problems pertaining to distance, time, and speed.</li> <li>• 7.11.5- Compare and contrast the different parts of a wave.</li> </ul>	<p><b>I can....</b></p> <ul style="list-style-type: none"> <li>• Define motion, distance, rate, speed, and velocity.</li> <li>• Describe the key difference between speed and velocity.</li> <li>• Recognize that speed=distance/time.</li> <li>• Define wave, amplitude, crest, trough, wavelength, resting position, transverse wave, longitudinal wave, compression, and rarefaction.</li> <li>• Label the parts of a transverse and longitudinal wave.</li> </ul>	<ul style="list-style-type: none"> <li>• Mini-Labs for S/D/T</li> <li>• Mini-Labs for waves</li> <li>• Summative Assessment: Weeks 8 &amp; 9.</li> </ul>

# Syllabus

## 7<sup>th</sup> Grade- Science 2<sup>nd</sup> 9 Weeks

### 10/17-11/4 – Weeks 1-3 – Cells/Levels of Organization

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.1.1- Identify and describe the function of major plant and animal cells.</li> <li>7.1.2- Interpret a chart to explain the integrated relationships that exist among cells, tissues, organ, and organ systems.</li> </ul>	<b>I can....</b> <ul style="list-style-type: none"> <li>Recognize the parts and functions of animal and plant cells.</li> <li>Define cell, prokaryotic, eukaryotic, organelle, cytoplasm, and nucleus.</li> <li>Create a venn diagram to compare plant and animal cells.</li> <li>Create a flow chart that shows the relationship between cells, tissues, organs, organ systems, and organisms.</li> </ul>	<ul style="list-style-type: none"> <li>Venn Diagram comparing plant and animal cells.</li> <li>Draw, color, and label plant and animal cell.</li> <li>Create a model of a cell.</li> <li>Cell Campaign project.</li> <li>Summative assessment: Weeks 1-3</li> </ul>

### 11/7-11/18 – Weeks 4 & 5 – Organ Systems

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.1.3- Explain the basic function of a major organ system</li> </ul>	<b>I can....</b> <ul style="list-style-type: none"> <li>Identify the 11 organ systems in the human body.</li> <li>Describe the main functions of each organ system.</li> </ul>	<ul style="list-style-type: none"> <li>Group research presentation.</li> <li>Matching of organ systems and functions.</li> <li>Summative assessment: Weeks 4 &amp; 5</li> </ul>

### 11/21-12/2 – Weeks 6 & 7 – Osmosis and Diffusion

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.1.5- Explain how materials move through simple diffusion.</li> </ul>	<p><b>I can....</b></p> <ul style="list-style-type: none"> <li>Define diffusion, osmosis, semi-permeable, permeable, and equilibrium.</li> <li>Identify examples of diffusion in everyday life.</li> <li>Describe the difference between diffusion and osmosis.</li> <li>Explain why particles move from high concentration to low concentration.</li> </ul>	<ul style="list-style-type: none"> <li>Labs for diffusion and osmosis.</li> <li>Egg osmosis</li> <li>Summative assessment: Weeks 6 &amp; 7</li> </ul>

### 12/5-12/16 – Weeks 8 & 9 – Photosynthesis and Cellular Respiration

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<ul style="list-style-type: none"> <li>7.3.1- Compare the chemical compounds that make up the reactants and products of photosynthesis and cellular respiration.</li> </ul>	<p><b>I can....</b></p> <ul style="list-style-type: none"> <li>Define reactant, product, photosynthesis, and cellular respiration.</li> <li>Identify reactants and products for photosynthesis and cellular respiration.</li> </ul>	<ul style="list-style-type: none"> <li>Create a diagram showing the relationship for photosynthesis and cellular respiration.</li> <li>Poem, Song, or cartoon depicting photosynthesis/cellular respiration.</li> <li>Summative Assessment: weeks 8 &amp; 9.</li> </ul>

**Syllabus**  
**8<sup>th</sup> Grade Science**

**First Nine-Weeks**

**Weeks 1-4 – Inquiry**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0807.Inq.1 (Variables and Controls)</b>            Design a simple experimental procedure with an identified control and appropriate variables.</p> <p><b>SPI 0807.Inq.2 (Tools and Procedures)</b>            Select tools and procedures needed to conduct a moderately complex experiment.</p> <p><b>SPI 0807.9.7 (Density)</b>            Apply an equation to determine the density of an object based on its mass and volume.</p> <p><b>SPI 0807.Inq.3 (Interpret Data)</b>            Interpret and translate data into a table, graph, or diagram.</p> <p><b>SPI 0807.Inq.4 (Cause and Effect)</b>            Draw a conclusion that establishes a cause and effect relationship supported by evidence.</p> <p><b>SPI 0807.Inq.5 (Bias or Error)</b>            Identify a faulty interpretation of data that is due to bias or experimental error.</p> <p><b>SPI 0807.12.4 (Measuring Mass and Weight)</b>            Distinguish between mass and weight using appropriate measuring instruments and units.</p>	<p>I can design an experiment with identified control and variables.</p> <p>I can use correct procedures and tools to conduct scientific investigations.</p> <p>I can solve for density based on mass and volume.</p> <p>I can correctly interpret data and explain the differences and specific purposes of a table, circle graph, line graph, and bar graph.</p> <p>I can identify the difference between a cause and the corresponding effect, and what is the connection between these two events in time.</p> <p>I can explain what mass and weight are, how they are measured, and units used to report these measurements.</p>	<p>Student will design an experiment and identify the controls and variables. Students will select and use appropriate procedures and tools.</p>

### Weeks 5-7– Technology & Engineering

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0807.T/E.1 (Prototype Testing)</b> Identify the tools and procedures needed to test the design features of a prototype.</p> <p><b>SPI 0807.T/E.2 (Engineering Design Process)</b> Evaluate a protocol to determine if the engineering design process was successfully applied.</p> <p><b>SPI 0807.T/E.3 (Intended/ Unintended Consequences)</b> Distinguish between the intended benefits and the unintended consequences of a new technology.</p> <p><b>SPI 0807.T/E.4 (Adaptive/Assistive Bioengineering)</b> Differentiate between adaptive and assistive bioengineered products (e.g., food, biofuels, medicines, integrated pest management).</p>	<p>I can identify the tools and testing methods for testing a given prototype.</p> <p>I can identify the commonly accepted process by which technology products are designed, tested, used, and produced?</p> <p>I can identify the intended benefits and the unintended consequences of technology products.</p> <p>I can describe the characteristics of adaptive and assistive bioengineering products.</p>	<p>Students will use the EDP to design a concept that is either adaptive or assistive.</p>

### Weeks 8-9 – States of Matter

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0807.9.6 (States Of Matter)</b> Compare the particle arrangement and type of particle motion associated with different states of matter.</p>	<p>I can describe and compare the particle arrangements and particle motions in solids, liquids, gases, and plasmas.</p>	<p>Lab investigation</p>

## 2<sup>nd</sup> Nine-Weeks

### Weeks 1-4 – Atoms and Periodic Table

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0807.9.1 (Atoms)</b> Recognize that all matter consists of atoms.</p> <p><b>SPI 0807.9.9 (Periodic Table)</b> Use the periodic table to determine the properties of an element.</p>	<p>I can describe the basic structure of atoms, and can distinguish among things made of atoms and things that are not made of atoms.</p> <p>I can use the periodic table to determine the atomic number, atomic mass, number of sub-atomic particles, and other properties of an atom.</p>	<p>Project on atomic structure and/or periodic table.</p>

### Weeks 5-9 – Chemical Reactions

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0807.9.2 (Chemical Change Outcomes)</b> Identify the common outcome of all chemical changes.</p> <p><b>SPI 0807.9.8 (Physical or Chemical Change)</b> Interpret the results of an investigation to determine whether a physical or chemical change has occurred.</p> <p><b>SPI 0807.9.10 (Reactants And Products)</b> Identify the reactants and products of a chemical reaction.</p>	<p>I can recognize when a chemical change has occurred and can identify the common outcomes of chemical reactions.</p> <p>I can tell the difference between a physical and chemical change.</p> <p>I can label the reactants and products in a chemical reaction.</p> <p>I can determine the number and type of atoms on each side of a chemical equation to confirm the Law of Conservation of Mass.</p>	<p>Lab investigations</p>

<p><b>SPI 0807.9.11 (Law Of Conservation Of Mass)</b> Recognize that in a chemical reaction the mass of the reactants is equal to the mass of the products.</p> <p><b>SPI 0807.9.12 (Acids And Bases)</b> Identify the basic properties of acids and bases.</p>	<p>I can describe the basic properties of acids and bases and use indicators to determine if a substance is an acid or base.</p>	
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### 3<sup>rd</sup> Nine weeks

#### Week 1-2 – Elements, Compounds and Mixtures

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0807.9.3 (Elements or Compounds)</b> Classify common substances as elements or compounds based on their symbols or formulas.</p> <p><b>SPI 0807. 9.4 (Mixtures or Compounds)</b> Differentiate between a mixture and a compound</p>	<p>I can interpret chemical symbols and chemical formulas to classify substances as elements or compounds.</p> <p>I can recognize the differences and similarities between mixtures and compounds.</p>	<p>Lab investigations</p>

#### Week 3-4 – Magnets Fields and Electromagnetism

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0807.12.1 (Electromagnetic Induction)</b> Recognize that electricity can be produced using a magnet and wire coil.</p> <p><b>SPI 0807.12.2 (Electromagnets)</b> Describe the basic principles of an electromagnet.</p> <p><b>SPI 0807.12.3 (Magnetic Fields)</b> Distinguish among the Earth's magnetic field, a magnet, and the fields that surround a magnet and an electromagnet.</p>	<p>I can describe how electricity is produced with a magnet and a coil of wire.</p> <p>I can describe the basic properties of electromagnets.</p> <p>I can describe the similarities and differences between the Earth's magnetic field, a permanent magnet, and an electromagnet.</p>	<p>Construct and test electromagnets</p>

### Week 5-6 – Mass and Gravity

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0807.12.5 (Gravity-Mass &amp; Distance)</b> Determine the relationship among the mass of objects, the distance between these objects, and the amount of gravitational attraction.</p> <p><b>SPI 0807.12.6 (Gravity And Celestial Motion)</b> Illustrate how gravity controls the motion of objects in the solar system.</p>	<p>I can describe gravity and mass and can explain how mass and distance affect gravitational attraction.</p>	

### Week 7-9 – Biodiversity

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>SPI 0807.5.1 (Classification Keys)</b> Use a simple classification key to identify an unknown organism.</p> <p><b>SPI 0807.5.2 (Adaptations)</b> Analyze structural, behavioral, and physiological adaptations to predict which populations are likely to survive in a particular environment.</p> <p><b>SPI 0807.5.3 (Variation In Populations)</b> Analyze data on levels of variation within a population to make predictions about survival under particular environmental conditions</p> <p><b>SPI 0807.5.4 (Biodiversity)</b> Identify several reasons for the importance of maintaining the earth's biodiversity.</p>	<p>I can create and interpret a classification key to identify an unknown organism.</p> <p>I can describe how species adapt their behavior and their structure in order to survive and thrive in a given environment.</p> <p>I can describe the connection between genetic variations within a population and the survival rate of the various sub-groups within that population.</p> <p>I can describe biodiversity and explain why it is important to preserve it.</p>	<p>Construct and use dichotomous keys</p> <p>Biodiversity Projects</p>

## 4<sup>th</sup> Nine Weeks

### Week 1-3– Relative Dating

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<b>SPI 0807.5.5 (Fossils and Relative Age)</b> Compare fossils found in sedimentary rock to determine their relative age.	I can describe how sedimentary rock forms, how fossils form, and how to determine the relative age of fossils based upon their position in rock strata.	Relative dating activity

### Week 4-7 – TCAP Review and TCAP

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
All 8 <sup>th</sup> grade standards reviewed and assessed	I can demonstrate mastery of science standards	

### Week 8-9 – Teacher Discretion

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>

# Anatomy and Physiology 1<sup>st</sup> 9Weeks Aug. 3<sup>rd</sup> –Oct. 2<sup>nd</sup> 2016

Week	Topic	Standard	Objective	Major Assignments
Week 1 August 1-5	What are the tools, knowledge, and dispositions are needed to conduct scientific inquiry.	Understandings about scientific inquiry and the ability to conduct inquiry are essential for living in the 21 <sup>st</sup> century.	<b>SW</b> develop the tools and thought process to develop scientific investigations and share their findings in a productive way.	Who are you? Writing Lab Reports Inference/Observation Investigation/Vocab
Week 2 August 8-12	How do science concepts, engineering, skills, and applications of technology improve the quality of life?	Society benefits/ engineers apply scientific discoveries to design materials and develop into enabling technologies	<b>SW</b> understand the connection between basic engineering process/technology/ and advances in science.	The engineering process? Engineering Investigation Designing a Connection Concept Map
Week 3 August 15-19	How is the body organized to function effectively and maintain homeostasis?	A/P investigates the interdependence of structure and function to form a living, integrated whole.	<b>SW</b> distinguish between and investigate anatomy and physiology	Concept map/ present Diagrams/Notes/vocab/ groups/article/lab
Week 4 August 22-26	How is the body organized to function effectively and maintain homeostasis?	A/P investigates the interdependence of structure and function to form a living, integrated whole.	<b>SW</b> investigate/use correct terminology for body cavities/ subdivisions/organs and describe the mechanisms of homeostasis.	Group discussion, Table write and Walk about. Notes/vocabulary/ groups/article/lab
Week 5 August 29- Sept. 2	How do body systems aid in support, protection, and movement as well as in maintaining homeostasis?	The integumentary, skeletal, muscular systems work together to support/protect/ move + maintain homeostasis	<b>SW</b> Identify the structures of the skin and explain their role in protecting the body and maintaining homeostasis	Model building/ Group research/ present Notes/vocabulary/groups/ articles/lab
Week 6 Sept. 5-9	How do body systems aid in support, protection, and movement as well as in maintaining homeostasis?	The integumentary, skeletal, muscular systems work together to support/protect/ move + maintain homeostasis	<b>SW</b> explain the physiological processes in healing the skin and construct a model of the skin.	Concept map/ present Diagrams/Notes/vocab/ groups/article/lab
Week 7 Sept. 12-16	How do body systems aid in support, protection, and movement as well as in maintaining homeostasis?	The integumentary, skeletal, muscular systems work together to support/protect/ move + maintain homeostasis	<b>SW</b> distinguish between the different types of bones and compare axial and appendicular skeletons.	Group discussion, Table write and Walk about. Notes/vocabulary/ groups/article/lab
Week 8 Sept. 19-23	How do body systems aid in support, protection, and movement as well as in maintaining homeostasis?	The integumentary, skeletal, muscular systems work together to support/protect/ move + maintain homeostasis	<b>SW</b> describe the physiological mechanisms involved in bone development, growth, and repair.	Group research/ present Notes/vocabulary/groups/ articles/lab
Week 9 Sept. 26-30	How do body systems aid in support, protection, and movement as well as in maintaining homeostasis?	The integumentary, skeletal, muscular systems work together to support/protect/ move + maintain homeostasis.	<b>SW</b> identify the major muscles of the body/observe/draw/and label the different types of muscle tissue, noting structure/function	Model building/ Group research/ present Notes/vocabulary/groups/ articles/lab

## Anatomy and Physiology 2<sup>nd</sup> 9Wks Oct. 17<sup>th</sup> – Dec. 18<sup>th</sup> 2016

Week	Topic	Standard	Objective	Major Assignments
Week 1 October 17 <sup>th</sup> - 21 <sup>st</sup>	How do body systems aid in support, protection, and movement as well as in maintaining homeostasis?	The integumentary, skeletal, muscular systems work together to support/protect/ move + maintain homeostasis	<b>SW</b> illustrate the major steps of the sliding filament theory of muscle contraction	Concept map/ present Problem solving/Notes/ vocabulary/groups/article/l ab
Week 2 October 24 <sup>th</sup> – 28 <sup>th</sup>	What external/ internal bodily mechanisms are involved in communication, control, growth, development?	The nervous/endocrine systems work in an integrative manner to maintain homeostasis/ communicate with other body systems.	<b>SW</b> compare/contrast the anatomy/ physiology of the central and peripheral nervous systems	Group discussion, Table write and Walk about. Notes/vocabulary/ groups/article/lab
Week 3 November 1 <sup>st</sup> - 4 <sup>th</sup>	What external/ internal bodily mechanisms are involved in communication, control, growth, development?	The nervous/endocrine systems work in an integrative manner to maintain homeostasis/ communicate with other body systems.	<b>SW</b> describe the structure/function/ Developmental aspects of neurons and supporting glial cells.	Group discussion, Table write and Walk about. Notes/vocabulary/ groups/article/lab
Week 4 November 7 <sup>th</sup> – 11 <sup>th</sup>	What external/ internal bodily mechanisms are involved in communication, control, growth, development?	The nervous/endocrine systems work in an integrative manner to maintain homeostasis/ communicate with other body systems.	<b>SW</b> investigate the physiology of electrochemical impulses and neural integration.	Group research/ present Notes/vocabulary/groups/ articles/lab
Week 5 November 14 <sup>th</sup> – 18 <sup>th</sup>	What external/ internal bodily mechanisms are involved in communication, control, growth, development?	The nervous/endocrine systems work in an integrative manner to maintain homeostasis/ communicate with other body systems.	<b>SW</b> investigate organs for perception of external stimuli and the maintenance of homeostasis.	Model building/ Group research/ present Notes/vocabulary/groups/a rticles/lab
Week 6 November 21 <sup>st</sup> - 25 <sup>th</sup>	What external/ internal bodily mechanisms are involved in communication, control, growth, development?	The nervous/endocrine systems work in an integrative manner to maintain homeostasis/ communicate with other body systems.	<b>SW</b> investigate organs for perception of external stimuli and the maintenance of homeostasis.	Model building/ Group research/ present Notes/vocabulary/groups/a rticles/lab
Week 7 Nov. 28 <sup>th</sup> – December 2 <sup>nd</sup>	What external/ internal bodily mechanisms are involved in communication, control, growth, development?	The nervous/endocrine systems work in an integrative manner to maintain homeostasis/ communicate with other body systems.	<b>SW</b> Identify the major organs of the endocrine system and the associated hormonal production and regulation.	Concept map/ present Problem solving/Notes/ vocabulary/groups/ article/lab
Week 8 December 5 <sup>th</sup> - 9 <sup>th</sup>	What external/ internal bodily mechanisms are involved in communication, control, growth, development?	The nervous/endocrine systems work in an integrative manner to maintain homeostasis/ communicate with other body systems.	<b>SW</b> Identify the major organs of the endocrine system and the associated hormonal production and regulation.	Group research/ present Notes/vocabulary/groups/a rticles/lab
Week 9 December 12 <sup>th</sup> – 16 <sup>th</sup>	<b>Prepare for/Take Exams</b>	<b>Students self-analysis of major standards</b>	<b>Make Up /Extensions</b>	<b>Recap Standards/Assessment review</b>

# Anatomy and Physiology 3<sup>rd</sup> 9Weeks Jan 2<sup>nd</sup> – March 3<sup>rd</sup> 2017

Week	Topic	Standard	Objective	Major Assignments
Week 1 January 2 <sup>nd</sup> – 6 <sup>th</sup>	How does the cardiovascular system transport substances that maintain homeostasis?	The cardiovascular system transports materials pumped by the heart through blood vessels to all parts of the body.	<b>SW</b> identify the molecular and cellular components of the blood and the functions of the blood	Concept map/ present Diagrams/Notes/vocab/ groups/article/lab
Week 2 January 9 <sup>th</sup> – 13 <sup>th</sup>	How does the cardiovascular system transport substances that maintain homeostasis?	The cardiovascular system transports materials pumped by the heart through blood vessels to all parts of the body.	<b>SW</b> explore the anatomy of the heart and describe the pathway of blood through this organ.	Model building/ Group research/ present Notes/vocabulary/groups/ articles/lab
Week 3 January 16 <sup>th</sup> – 20 <sup>th</sup>	How does the cardiovascular system transport substances that maintain homeostasis?	The cardiovascular system transports materials pumped by the heart through blood vessels to all parts of the body.	<b>SW</b> describe the biochemical and physiological nature of heart function.	Concept map/ present Problem solving/Notes/ vocabulary/groups/article/lab
Week 4 January 23 <sup>rd</sup> – 27 <sup>th</sup>	How does the cardiovascular system transport substances that maintain homeostasis?	The cardiovascular system transports materials pumped by the heart through blood vessels to all parts of the body.	<b>SW</b> describe the relationship between the structure and function of different types of blood vessels.	Concept map/ present Diagrams/Notes/vocab/ groups/article/lab
Week 5 January 30 <sup>th</sup> – February 3 <sup>rd</sup>	How does the cardiovascular system transport substances that maintain homeostasis?	The cardiovascular system transports materials pumped by the heart through blood vessels to all parts of the body.	<b>SW</b> describe the physiological basis of circulation and blood pressure	Group discussion, Table write and Walk about. Notes/vocabulary/ groups/article/lab
Week 6 February 6 <sup>th</sup> – 10 <sup>th</sup>	What mechanisms are involved in staying healthy through the immune responses?	The lymphatic system bathes the body in extracellular fluid and works with the cardiovascular system to provide immunity and regulate fat metabolism.	<b>SW</b> identify the structures of the lymphatic system.	Model building/ Group research/ present Notes/vocabulary/groups/ articles/lab
Week 7 February 13 <sup>th</sup> – 17 <sup>th</sup>	What mechanisms are involved in staying healthy through the immune responses?	The lymphatic system bathes the body in extracellular fluid and works with the cardiovascular system to provide immunity and regulate fat metabolism.	<b>SW</b> describe the details of the immune response.	Concept map/ present Problem solving/Notes/ vocabulary/groups/article/lab
Week 8 February 20 <sup>th</sup> – 24 <sup>th</sup>	How does the digestive system convert food into the raw materials that build and fuel the body's cells?	The digestive system takes in food and changes it to a usable form.	<b>SW</b> identify the organs of the digestive system/investigate mechanisms of digestion and food absorption.	Model building/ Group research/ present Notes/vocabulary/groups/ articles/lab
Week 9 February 27 <sup>th</sup> – March 3 <sup>rd</sup>	How does the digestive system convert food into the raw materials that build and fuel the body's cells?	The digestive system takes in food and changes it to a usable form.	<b>SW</b> describe how nutrition, metabolism, and body temperature are related.	Group research/ present Notes/vocabulary/groups/ articles/lab

# Anatomy and Physiology 4<sup>th</sup> 9Weeks March 6<sup>th</sup> – May 26<sup>th</sup> 2017

Week	Topic	Standard	Objective	Major Assignments
Week 1 March 6 <sup>th</sup> – 10 <sup>th</sup>	How does the urinary system maintain the homeostatic balance of internal fluids?	The urinary system removes wastes and maintains osmotic balance.	<b>SW</b> explain how the kidneys function to remove wastes from the blood.	Group discussion, Table write and Walk about. Notes/vocabulary/groups/article/lab
Week 2 March 13 <sup>th</sup> – 17 <sup>th</sup>	How do the organs and structures of the reproductive system function to produce successive generations of offspring?	The reproductive system ensures the continuity of a species.	<b>SW</b> Identify/describe the functions of the essential and accessory organs of the male and female reproductive systems.	Group research/ present Notes/vocabulary/groups/articles/lab
Week 3 March 27 <sup>th</sup> – 31 <sup>st</sup>	How do the organs and structures of the reproductive system function to produce successive generations of offspring?	The reproductive system ensures the continuity of a species.	<b>SW</b> explain hormonal regulation during a typical 28 day menstrual cycle/ and Summarize the principal events that occur during prenatal development.	Concept map/ present Diagrams/Notes/vocab/groups/article/lab
Week 4 April 3 <sup>rd</sup> – 7 <sup>th</sup>	<b>Recap of all topics and standards</b>	<b>Recap of all topics and standards</b>		Forensic Fetal Pig Dissection
Week 5 April 10 <sup>th</sup> – 14 <sup>th</sup>	<b>Recap of all topics and standards</b>	<b>Recap of all topics and standards</b>		Forensic Fetal Pig Dissection
Week 6 April 17 <sup>th</sup> – 21 <sup>st</sup>	<b>Recap of all topics and standards</b>	<b>Recap of all topics and standards</b>		Cat Dissection
Week 7 April 24 <sup>th</sup> – 28 <sup>th</sup>	<b>Recap of all topics and standards</b>	<b>Recap of all topics and standards</b>		Individual research Presentations
Week 8 May 1 <sup>st</sup> – 5 <sup>th</sup>	<b>Recap Standards/Assessment review</b>	<b>Make Up /Extensions</b>		<b>Students self-analysis of major standards</b>
Week 9 May 8 <sup>th</sup> – 26	<b>Prepare for/Take Exams</b>	<b>Prepare for/Take Exam</b>	<b>Prepare for/Take Exam</b>	<b>Prepare for/Take Exam</b>

***The teacher reserves the right to make changes as necessary.***

# Syllabus

## AP Biology

### Unit 1 & 2: Biodiversity and Change/Bioinformatics

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
1.A: Change in the genetic makeup of a population over time is evolution. 1.B: Organisms are linked by lines of descent from common ancestry. 1.C: Life continues to evolve within a changing environment.	<ol style="list-style-type: none"><li>1. The student is able to convert a data set from a table of numbers that reflect a change in the genetic makeup of a population over time and to apply mathematical methods and conceptual understandings to investigate the cause(s) and effect(s) of this change.</li><li>2. The student is able to evaluate evidence provided by data to qualitatively and quantitatively investigate the role of natural selection in evolution</li><li>3. The student is able to apply mathematical methods to data from a real or simulated population to predict what will happen to the population in the future.</li><li>4. The student is able to connect evolutionary changes in a population over time to a change in the environment.</li><li>5. The student is able to describe specific examples of conserved core biological processes and features shared by all domains or within one domain of life, and how these shared, conserved core processes and features support the concept of common ancestry for all organisms.</li></ol>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

	6. The student is able to describe specific examples of conserved core biological processes and features shared by all domains or within one domain of life, and how these shared, conserved core processes and features support the concept of common ancestry for all organisms.	
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### Unit 3: Ecology

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
4.A: Interactions within biological systems lead to complex properties. 4.B: Competition and cooperation are important aspects of biological systems. 4.C: Naturally occurring diversity among and between components within biological systems affects interactions with the environment.	<ol style="list-style-type: none"> <li>1. Communities are composed of populations of organisms that interact in complex ways.</li> <li>2. Interactions among living systems and with their environment result in the movement of matter and energy.</li> <li>3. Interactions between and within populations influence patterns of species distribution and abundance.</li> <li>4. Interactions between and within populations influence patterns of species distribution and abundance</li> <li>5. The level of variation in a population affects population dynamics.</li> <li>6. The diversity of species within an ecosystem may influence the stability of the ecosystem.</li> </ol>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

### Unit 4: Biochemistry

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
4.A: Interactions within biological systems lead to complex properties. 4.B: Competition and cooperation are important aspects of biological systems	<ol style="list-style-type: none"> <li>1. The subcomponents of biological molecules and their sequence determine the properties of that molecule.</li> </ol>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

<p>2.A: Growth, reproduction and maintenance of the organization of living systems require free energy and matter.</p>	<ol style="list-style-type: none"> <li>2. The structure and function of subcellular components, and their interactions, provide essential cellular processes.</li> <li>3. Interactions between molecules affect their structure and function.</li> <li>4. Organisms must exchange matter with the environment to grow, reproduce and maintain organization.</li> <li>5. Organisms must exchange matter with the environment to grow, reproduce and maintain organization.</li> </ol>	
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### Unit 5: Cells

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>4.A: Interactions within biological systems lead to complex properties.            4.B: Competition and cooperation are important aspects of biological systems.            2.B: Growth, reproduction and dynamic homeostasis require that cells create and maintain internal environments that are different from their external environments.</p>	<ol style="list-style-type: none"> <li>1. The structure and function of subcellular components, and their interactions, provide essential cellular processes.</li> <li>2. Cell membranes are selectively permeable due to their structure</li> <li>3. Cell membranes are selectively permeable due to their structure</li> <li>4. Cell membranes are selectively permeable due to their structure</li> </ol>	<p>Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Unit 6: Cellular Respiration

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>2.A: Growth, reproduction and maintenance of the organization of living systems require free energy and matter.</p>	<ol style="list-style-type: none"> <li>1. All living systems require constant input of free energy.</li> <li>2. Organisms capture and store free energy for use in biological processes.</li> </ol>	<p>Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

**Dates from current calendar – Weeks to cover topic – Topic covered**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>

**Dates from current calendar – Weeks to cover topic – Topic covered**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>

**Dates from current calendar – Weeks to cover topic – Topic covered**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>

# Syllabus

## AP Environmental Science

### Topic 1: Earth Systems and Resources

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand the interactions of the earth's systems and resources.	<p>A. Earth Science Concepts (Geologic time scale; plate tectonics, earthquakes, volcanism; seasons; solar intensity and latitude)</p> <p>B. The Atmosphere (Composition; structure; weather and climate; atmospheric circulation and the Coriolis Effect; atmosphere–ocean interactions; ENSO)</p> <p>C. Global Water Resources and Use (Freshwater/saltwater; ocean circulation; agricultural, industrial, and domestic use; surface and groundwater issues; global problems; conservation)</p> <p>D. Soil and Soil Dynamics (Rock cycle; formation; composition; physical and chemical properties; main soil types; erosion and other soil problems; soil conservation)</p>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

### Topic 2: The Living World

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand the interaction of the living world	A. Ecosystem Structure (Biological populations and communities; ecological niches; interactions among species; keystone species; species diversity and edge effects; major terrestrial and aquatic biomes)	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

	<p>B. Energy Flow (Photosynthesis and cellular respiration; food webs and trophic levels; ecological pyramids)</p> <p>C. Ecosystem Diversity (Biodiversity; natural selection; evolution; ecosystem services)</p> <p>D. Natural Ecosystem Change (Climate shifts; species movement; ecological succession)</p> <p>E. Natural Biogeochemical Cycles (Carbon, nitrogen, phosphorus, sulfur, water, conservation of matter)</p>	
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### Topic 3: Population

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand the complex interactions that control populations and the effect population growth has on the earth.	<p>A. Population Biology Concepts (Population ecology; carrying capacity; reproductive strategies; survivorship)</p> <p>B. Human Population</p> <ol style="list-style-type: none"> <li>1. Human population dynamics (Historical population sizes; distribution; fertility rates; growth rates and doubling times; demographic transition; age-structure diagrams)</li> <li>2. Population size (Strategies for sustainability; case studies; national policies)</li> <li>3. Impacts of population growth (Hunger; disease; economic effects; resource use; habitat destruction)</li> </ol>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

## Topic 4: Land and Water Use

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>Understand the complex interaction of land and water use.</p>	<ul style="list-style-type: none"> <li>A. Agriculture 1. Feeding a growing population (Human nutritional requirements; types of agriculture; Green Revolution; genetic engineering and crop production; deforestation; irrigation; sustainable agriculture) 2. Controlling pests (Types of pesticides; costs and benefits of pesticide use; integrated pest management; relevant laws)</li> <li>B. Forestry (Tree plantations; old growth forests; forest fires; forest management; national forests)</li> <li>C. Rangelands (Overgrazing; deforestation; desertification; rangeland management; federal rangelands)</li> <li>D. Other Land Use 1. Urban land development (Planned development; suburban sprawl; urbanization) 2. Transportation infrastructure (Federal highway system; canals and channels; roadless areas; ecosystem impacts) 3. Public and federal lands (Management; wilderness areas; national parks; wildlife refuges; forests; wetlands) 4. Land conservation options (Preservation; remediation; mitigation; restoration) 5. Sustainable land-use strategies</li> <li>E. Mining (Mineral formation; extraction; global reserves; relevant laws and treaties)</li> </ul>	<p>Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

	F. Fishing (Fishing techniques; overfishing; aquaculture; relevant laws and treaties) G. Global Economics (Globalization; World Bank; Tragedy of the Commons; relevant laws and treaties)	
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### Topic 5: Energy Resources and Consumption

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand the source and consumption of energy by humans.	<p>A. Energy Concepts (Energy forms; power; units; conversions; Laws of Thermodynamics)</p> <p>B. Energy Consumption 1. History (Industrial Revolution; exponential growth; energy crisis) 2. Present global energy use 3. Future energy needs</p> <p>C. Fossil Fuel Resources and Use (Formation of coal, oil, and natural gas; extraction/purification methods; world reserves and global demand; synfuels; environmental advantages/disadvantages of sources)</p> <p>D. Nuclear Energy (Nuclear fission process; nuclear fuel; electricity production; nuclear reactor types; environmental advantages/disadvantages; safety issues; radiation and human health; radioactive wastes; nuclear fusion)</p> <p>E. Hydroelectric Power (Dams; flood control; salmon; silting; other impacts)</p> <p>F. Energy Conservation (Energy efficiency; CAFE standards; hybrid electric vehicles; mass transit)</p>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

	G. Renewable Energy (Solar energy; solar electricity; hydrogen fuel cells; biomass; wind energy; small-scale hydroelectric; ocean waves and tidal energy; geothermal; environmental advantages/disadvantages)	
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## Topic 6: Pollution

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand types and sources of pollution	<p>A. Pollution Types</p> <p>1. Air pollution (Sources — primary and secondary; major air pollutants; measurement units; smog; acid deposition — causes and effects; heat islands and temperature inversions; indoor air pollution; remediation and reduction strategies; Clean Air Act and other relevant laws)</p> <p>2. Noise pollution (Sources; effects; control measures)</p> <p>3. Water pollution (Types; sources, causes, and effects; cultural eutrophication; groundwater pollution; maintaining water quality; water purification; sewage treatment/septic systems; Clean Water Act and other relevant laws)</p> <p>4. Solid waste (Types; disposal; reduction)</p> <p>B. Impacts on the Environment and Human Health</p> <p>1. Hazards to human health (Environmental risk analysis; acute and chronic effects; dose-response relationships; air pollutants; smoking and other risks)</p> <p>2. Hazardous chemicals in the environment (Types of hazardous waste; treatment/disposal of hazardous waste; cleanup of contaminated sites; biomagnification; relevant laws)</p>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

	C. Economic Impacts (Cost-benefit analysis; externalities; marginal costs; sustainability)	
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**Topic 7: Global Change**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand the impact of humans on the global environment	<p>A. Stratospheric Ozone (Formation of stratospheric ozone; ultraviolet radiation; causes of ozone depletion; effects of ozone depletion; strategies for reducing ozone depletion; relevant laws and treaties)</p> <p>B. Global Warming (Greenhouse gases and the greenhouse effect; impacts and consequences of global warming; reducing climate change; relevant laws and treaties)</p> <p>C. Loss of Biodiversity 1. Habitat loss; overuse; pollution; introduced species; endangered and extinct species 2. Maintenance through conservation 3. Relevant laws and treaties</p>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

# Syllabus

## AP Environmental Science

### Topic 1: Earth Systems and Resources

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand the interactions of the earth's systems and resources.	<p>A. Earth Science Concepts (Geologic time scale; plate tectonics, earthquakes, volcanism; seasons; solar intensity and latitude)</p> <p>B. The Atmosphere (Composition; structure; weather and climate; atmospheric circulation and the Coriolis Effect; atmosphere–ocean interactions; ENSO)</p> <p>C. Global Water Resources and Use (Freshwater/saltwater; ocean circulation; agricultural, industrial, and domestic use; surface and groundwater issues; global problems; conservation)</p> <p>D. Soil and Soil Dynamics (Rock cycle; formation; composition; physical and chemical properties; main soil types; erosion and other soil problems; soil conservation)</p>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

### Topic 2: The Living World

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand the interaction of the living world	A. Ecosystem Structure (Biological populations and communities; ecological niches; interactions among species; keystone species; species diversity and edge effects; major terrestrial and aquatic biomes)	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

	<p>B. Energy Flow (Photosynthesis and cellular respiration; food webs and trophic levels; ecological pyramids)</p> <p>C. Ecosystem Diversity (Biodiversity; natural selection; evolution; ecosystem services)</p> <p>D. Natural Ecosystem Change (Climate shifts; species movement; ecological succession)</p> <p>E. Natural Biogeochemical Cycles (Carbon, nitrogen, phosphorus, sulfur, water, conservation of matter)</p>	
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### Topic 3: Population

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand the complex interactions that control populations and the effect population growth has on the earth.	<p>A. Population Biology Concepts (Population ecology; carrying capacity; reproductive strategies; survivorship)</p> <p>B. Human Population</p> <ol style="list-style-type: none"> <li>1. Human population dynamics (Historical population sizes; distribution; fertility rates; growth rates and doubling times; demographic transition; age-structure diagrams)</li> <li>2. Population size (Strategies for sustainability; case studies; national policies)</li> <li>3. Impacts of population growth (Hunger; disease; economic effects; resource use; habitat destruction)</li> </ol>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

## Topic 4: Land and Water Use

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>Understand the complex interaction of land and water use.</p>	<ul style="list-style-type: none"> <li>A. Agriculture 1. Feeding a growing population (Human nutritional requirements; types of agriculture; Green Revolution; genetic engineering and crop production; deforestation; irrigation; sustainable agriculture) 2. Controlling pests (Types of pesticides; costs and benefits of pesticide use; integrated pest management; relevant laws)</li> <li>B. Forestry (Tree plantations; old growth forests; forest fires; forest management; national forests)</li> <li>C. Rangelands (Overgrazing; deforestation; desertification; rangeland management; federal rangelands)</li> <li>D. Other Land Use 1. Urban land development (Planned development; suburban sprawl; urbanization) 2. Transportation infrastructure (Federal highway system; canals and channels; roadless areas; ecosystem impacts) 3. Public and federal lands (Management; wilderness areas; national parks; wildlife refuges; forests; wetlands) 4. Land conservation options (Preservation; remediation; mitigation; restoration) 5. Sustainable land-use strategies</li> <li>E. Mining (Mineral formation; extraction; global reserves; relevant laws and treaties)</li> </ul>	<p>Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

	F. Fishing (Fishing techniques; overfishing; aquaculture; relevant laws and treaties) G. Global Economics (Globalization; World Bank; Tragedy of the Commons; relevant laws and treaties)	
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### Topic 5: Energy Resources and Consumption

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand the source and consumption of energy by humans.	<p>A. Energy Concepts (Energy forms; power; units; conversions; Laws of Thermodynamics)</p> <p>B. Energy Consumption 1. History (Industrial Revolution; exponential growth; energy crisis) 2. Present global energy use 3. Future energy needs</p> <p>C. Fossil Fuel Resources and Use (Formation of coal, oil, and natural gas; extraction/purification methods; world reserves and global demand; synfuels; environmental advantages/disadvantages of sources)</p> <p>D. Nuclear Energy (Nuclear fission process; nuclear fuel; electricity production; nuclear reactor types; environmental advantages/disadvantages; safety issues; radiation and human health; radioactive wastes; nuclear fusion)</p> <p>E. Hydroelectric Power (Dams; flood control; salmon; silting; other impacts)</p> <p>F. Energy Conservation (Energy efficiency; CAFE standards; hybrid electric vehicles; mass transit)</p>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

	G. Renewable Energy (Solar energy; solar electricity; hydrogen fuel cells; biomass; wind energy; small-scale hydroelectric; ocean waves and tidal energy; geothermal; environmental advantages/disadvantages)	
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## Topic 6: Pollution

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand types and sources of pollution	<p>A. Pollution Types</p> <p>1. Air pollution (Sources — primary and secondary; major air pollutants; measurement units; smog; acid deposition — causes and effects; heat islands and temperature inversions; indoor air pollution; remediation and reduction strategies; Clean Air Act and other relevant laws)</p> <p>2. Noise pollution (Sources; effects; control measures)</p> <p>3. Water pollution (Types; sources, causes, and effects; cultural eutrophication; groundwater pollution; maintaining water quality; water purification; sewage treatment/septic systems; Clean Water Act and other relevant laws)</p> <p>4. Solid waste (Types; disposal; reduction)</p> <p>B. Impacts on the Environment and Human Health</p> <p>1. Hazards to human health (Environmental risk analysis; acute and chronic effects; dose-response relationships; air pollutants; smoking and other risks)</p> <p>2. Hazardous chemicals in the environment (Types of hazardous waste; treatment/disposal of hazardous waste; cleanup of contaminated sites; biomagnification; relevant laws)</p>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

	C. Economic Impacts (Cost-benefit analysis; externalities; marginal costs; sustainability)	
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### Topic 7: Global Change

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
Understand the impact of humans on the global environment	<p>A. Stratospheric Ozone (Formation of stratospheric ozone; ultraviolet radiation; causes of ozone depletion; effects of ozone depletion; strategies for reducing ozone depletion; relevant laws and treaties)</p> <p>B. Global Warming (Greenhouse gases and the greenhouse effect; impacts and consequences of global warming; reducing climate change; relevant laws and treaties)</p> <p>C. Loss of Biodiversity 1. Habitat loss; overuse; pollution; introduced species; endangered and extinct species 2. Maintenance through conservation 3. Relevant laws and treaties</p>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

# Biology I

## 1<sup>st</sup> Semester Syllabus

### Week 1- Biology in the 21<sup>st</sup> Century (The Study of Life, Unifying Themes of Biology, & Scientific Thinking and Process)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.Inq.1 Recognize that science is a progressive endeavor that reevaluates and extends what is already accepted.</p> <p>CLE 3210.Inq.2 Design and conduct scientific investigations to explore new phenomena, verify previous results, test how well a theory predicts, and compare opposing theories.</p> <p>CLE 3210.Inq.4 Apply qualitative and quantitative measures to analyze data and draw conclusions that are free of bias.</p> <p>CLE 3210.Inq.5 Compare experimental evidence and conclusions with those drawn by others about the same testable question.</p> <p>CLE 3210.Inq.6 Communicate and defend scientific findings.</p> <p>SPI 3210 Inq.1 Select a description or scenario that reevaluates and/or extends a scientific finding.</p> <p>SPI 3210 Inq.2 Analyze the components of a properly designed scientific investigation.</p> <p>SPI 3210 Inq.5 Defend a conclusion based on scientific evidence.</p> <p>SPI 3210 Inq.6 Determine why a conclusion is free of bias.</p> <p>SPI 3210 Inq.7 Compare conclusions that offer different, but acceptable explanations for the same set of experimental data.</p>	<ul style="list-style-type: none"> <li>• Define and give examples of Earth's biodiversity.</li> <li>• Summarize the characteristics that all living things share.</li> <li>• Summarize four major unifying themes of biology.</li> <li>• Identify the different elements of scientific inquiry through observations.</li> <li>• Differentiate between theories and hypotheses</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

**Week 2- Biology in the 21<sup>st</sup> Century (Biologists' Tools and Technology & Biology and Your Future)**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.Inq.1 Recognize that science is a progressive endeavor that reevaluates and extends what is already accepted.</p> <p>CLE 3210.Inq.3 Use appropriate tools and technology to collect precise and accurate data.</p> <p>CLE 3210.T/E.1 Explore the impact of technology on social, political, and economic systems.</p> <p>SPI 3210 Inq.3 Determine appropriate tools to gather precise and accurate data.</p> <p>SPI 3210 Inq.4 Evaluate the accuracy and precision of data.</p> <p>SPI 3210.T/E.1 Distinguish among tools and procedures best suited to conduct a specified scientific inquiry.</p> <p>SPI 3210.T/E.2 Evaluate a protocol to determine the degree to which an engineering design process was successfully applied.</p> <p>SPI 3210.T/E.3 Evaluate the overall benefit to cost ratio of a new technology.</p> <p>SPI 3210.T/E.4 Use design principles to determine how a new technology will improve the quality of life for an intended audience.</p>	<ul style="list-style-type: none"> <li>• Describe the usefulness of modern imaging technologies.</li> <li>• Identify the different elements of scientific inquiry through observations.</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 3 & 4 -Chemistry of Life (Atoms, Ions, and Molecules, Properties of Water, & Carbon-Based Molecules)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.1.2 Distinguish among the structure and function of the four major organic macromolecules found in living things.</p> <p>SPI 3210.1.3 Distinguish among proteins, carbohydrates, lipids, and nucleic acids.</p> <p>SPI 3210.1.4 Identify positive tests for carbohydrates, lipids, and proteins.</p>	<ul style="list-style-type: none"><li>• Identify elements common to living things.</li><li>• Describe how ions form.</li><li>• Compare ionic and</li><li>• covalent bonding</li><li>• Recognize the importance of hydrogen bonding.</li><li>• Explain why many compounds dissolve in water.</li><li>• Compare acids and bases.</li><li>• Describe the bonding properties of carbon atoms.</li><li>• Compare carbohydrates, lipids, proteins, and nucleic acids.</li></ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 5- Chemistry of Life (Chemical Reactions & Enzymes)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.1.3 Describe how enzymes regulate chemical reactions in the body.</p> <p>SPI 3210.1.5 Identify how enzymes control chemical reactions in the body.</p>	<ul style="list-style-type: none"><li>• Describe how bonds break and reform during chemical reactions. Explain why chemical reactions release or absorb energy.</li><li>• Explain the effect of a catalyst on activation energy. Describe how enzymes regulate chemical reactions</li></ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 6-Cell Structure and Function (Cell Theory & Cell Organelles)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>CLE 3210.1.1 Compare the structure and function of cellular organelles in both prokaryotic and eukaryotic cells.</b>            SPI 3210.1.1 Identify the cellular organelles associated with major cell processes.            SPI 3210.1.2 Distinguish between prokaryotic and eukaryotic cells.</p>	<ul style="list-style-type: none"> <li>• Describe the internal structures of eukaryotic cells.</li> <li>• Summarize the functions of organelles in plant and animal cells.</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 7- Cell Structure and Function

#### (Cell Membrane, Diffusion and Osmosis, Active Transport, Endocytosis, & Exocytosis)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p><b>CLE 3210.1.5 Compare different models to explain the movement of materials into and out of cells</b>            SPI 3210.1.7 Predict the movement of water and other molecules across selectively permeable membranes.            SPI 3210.1.8 Compare and contrast active and passive transport.</p>	<ul style="list-style-type: none"> <li>• Describe passive transport.</li> <li>• Distinguish between osmosis, diffusion, and facilitated transport.</li> <li>• Describe active transport.</li> <li>• Distinguish among endocytosis, phagocytosis, and exocytosis</li> <li>• Describe the structure of the cell membrane.</li> <li>• Summarize how chemical signals are transmitted across the cell membrane</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 8-Cells and Energy (Chemical Energy and ATP, Overview of Photosynthesis, & Photosynthesis in Detail)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.3.3 Investigate the relationship between the processes of photosynthesis and cellular respiration.</p> <p>CLE 3210.3.4 Describe the events which occur during the major biogeochemical cycles.</p> <p>SPI 3210.3.3 Compare and contrast photosynthesis and cellular respiration in terms of energy transformation.</p> <p>SPI 3210.3.4 Predict how changes in a biogeochemical cycle can affect an ecosystem.</p>	<ul style="list-style-type: none"> <li>• Recognize the importance of ATP as an energy-carry molecule.</li> <li>• Identify energy sources used by organisms.</li> <li>• Relate producers to photosynthesis.</li> <li>• Describe the process of photosynthesis.</li> <li>• Describe the light-dependent reactions in which energy is captured. Describe the light-independent reactions in which sugar is produced.</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 9-Cells and Energy (Overview of Cellular Respiration, Cellular Respiration in Detail, & Fermentation)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.3.2 Distinguish between aerobic and anaerobic respiration.</p> <p>SPI 3210.3.3 Compare and contrast photosynthesis and cellular respiration in terms of energy transformation.</p> <p>SPI 3210.3.2 Distinguish between aerobic and anaerobic respiration.</p> <p>SPI 3210.3.4 Predict how changes in a biogeochemical cycle can affect an ecosystem.</p>	<ul style="list-style-type: none"> <li>• Describe the process of cellular respiration.</li> <li>• Describe the process of glycolysis.</li> <li>• Describe the details of the Krebs cycle and the electron transport chain.</li> <li>• Compare cellular respiration to photosynthesis.</li> <li>• Describe the process of fermentation. Summarize the importance of fermentation.</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 10-Cell Growth and Division (The Cell Cycle & Mitosis and Cytokinesis)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.1.4 Describe the processes of cell growth and reproduction.</p> <p>SPI 3210.1.6 Demonstrate the movement of chromosomes during mitosis and cytokinesis.</p> <p><b>SPI 3210.1.6 Determine the relationship between cell growth and cell reproduction.</b></p>	<ul style="list-style-type: none"> <li>• Describe the stages of the cell cycle.</li> <li>• Compare rates of division in different cell types.</li> <li>• Compare rates of division in different cell types.</li> <li>• Identify factors that limit cell size.</li> <li>• Describe the structure of a chromosome.</li> <li>• Follow chromosomes through the processes of mitosis and cytokinesis</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 11- Cell Growth and Division (Regulation of the Cell Cycle, Asexual Reproduction, & Multicellular Life)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.1.4 Describe the processes of cell growth and reproduction.</p> <p>SPI 3210.1.6 Demonstrate the movement of chromosomes during mitosis and cytokinesis.</p>	<ul style="list-style-type: none"> <li>• Identify internal and external factors that regulate cell division.</li> <li>• Explain cancer in terms of the cell cycle.</li> <li>• Compare and contrast binary fission and mitosis.</li> <li>• Describe how some eukaryotes reproduce through mitosis.</li> <li>• Describe the specialization in multicellular organisms. Identify different types of stem cells.</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

## Week 12-Meiosis and Mendel (Chromosomes and Meiosis & Process of Meiosis)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.1.4 Describe the processes of cell growth and reproduction.</p> <p>SPI 3210.1.6 Demonstrate the movement of chromosomes during mitosis and cytokinesis.</p> <p>CLE 3210.4.2 Describe the relationships among genes, chromosomes, proteins, and hereditary traits.</p>	<ul style="list-style-type: none"> <li>• Differentiate between body cells and gametes.</li> <li>• Compare and contrast autosomes and sex chromosomes.</li> <li>• Compare and contrast the two rounds of division in meiosis.</li> <li>• Describe how haploid cells develop in mature gametes.</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

## Week 13 & 14-Meiosis and Mendel (Mendel and Heredity, Traits, Genes, and Alleles, Traits and Probability, Meiosis and Genetic and Variation)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.4.2 Describe the relationships among genes, chromosomes, proteins, and hereditary traits.</p> <p>SPI 3210.Math.2 Predict the outcome of a cross between parents of known genotype.</p> <p>CLE 3210.Inq.1 Recognize that science is a progressive endeavor that reevaluates and extends what is already accepted.</p> <p>CLE 3210.4.4 Compare different modes of inheritance: sex linkage, co-dominance, incomplete dominance, multiple alleles, and polygenic traits</p>	<ul style="list-style-type: none"> <li>• Describe the patterns of inheritance that Mendel's data revealed.</li> <li>• Summarize Mendel's law of segregation.</li> <li>• Explain how there can be many versions of one gene.</li> <li>• Describe how genes influence the development of traits.</li> <li>• Describe monohybrid and dihybrid crosses.</li> <li>• Explain how heredity can be illustrated mathematically.</li> <li>• Describe how sexual reproduction creates unique gene combinations.</li> <li>• Explain how crossing over during meiosis increases diversity.</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 15-Extending Mendelian Genetics (Chromosomes and Phenotype & Complex Patterns of Inheritance)

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3210.4.2 Describe the relationships among genes, chromosomes, proteins, and hereditary traits.</p> <p>CLE 3210.Inq.1 Recognize that science is a progressive endeavor that reevaluates and extends what is already accepted.</p> <p>CLE 3210.4.4 Compare different modes of inheritance: sex linkage, co-dominance, incomplete dominance, multiple alleles, and polygenic traits.</p> <p>SPI 3210.Math.2 Predict the outcome of a cross between parents of known genotype.</p>	<ul style="list-style-type: none"> <li>• Relate dominant-recessive patterns of inheritance in autosomal chromosomes to genetic disorders.</li> <li>• Describe patterns of inheritance in sex-linked traits.</li> <li>• Describe different types of allele interactions.</li> <li>• Describe polygenic traits and the effect of environmental factors on phenotype.</li> </ul>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 16-Review all major standards for Mid-Term Exams

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>Review all previous standards covered</p>	<p>Review all previous objectives covered</p>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Week 17- Mid-Term Exams

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>Mid-Term Exam</p>	<p>Mid-Term Exam</p>	<p>Major Assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

# Biology II 1<sup>st</sup> 9Weeks August 3<sup>rd</sup> –October 2<sup>nd</sup> 2016

Week	Topic	Standard	Objective	Major Assignments
Week 1 August 1-5	What are the tools, knowledge, and dispositions are needed to conduct scientific inquiry.	Understandings about scientific inquiry and the ability to conduct inquiry are essential for living in the 21 <sup>st</sup> century.	Students develop the tools and thought process to develop scientific investigations and share their findings in a productive way.	Who are you? Writing Lab Reports Inference/Observation lab Notes/ Vocabulary Groups/articles/lab
Week 2 August 8-12	How do science concepts, engineering, skills, and applications of technology improve the quality of life?	Society benefits when engineers apply scientific discoveries to design materials and processes that develop into technologies	Students understand the connection between basic engineering process and technology and advances in science.	What is the engineering process? Engineering Investigation Designing a Connection Concept Map/Groups/articles/lab
Week 3 August 15-19	What mathematical skills and understandings are needed to successfully investigate biological topics?	Science applies mathematics to investigate questions, solve problems, and communicate findings.	Students understand and utilize the mathematical principles associated with biology.	Using Statistics Graphing Results Notes/Vocabulary/Groups/articles/ lab
Week 4 August 22-26	How are cells organized to carry on the processes of life?	All living things are made of cells that perform functions necessary for life.	Students understand the characteristics of prokaryotic and eukaryotic cells, and describe processes of the cell.	Macromolecule lab/ diagrams Concept map comparing Prokaryotic/eukaryotic cells. Notes/Vocabulary/Groups/articles /lab
Week 5 August 29- Sept. 2	How are cells organized to carry on the processes of life?	All living things are made of cells that perform functions necessary for life.	Students understand how substances move into and out of cells.	Diffusion lab Movement Concept map Notes/Vocabulary/Groups/articles
Week 6 Sept. 5-9	How are cells organized to carry on the processes of life?	All living things are made of cells that perform functions necessary for life.	Students understand the enzyme/substrate relationship	Students build an enzyme/substrate model/Notes/vocabulary/groups/articles/lab
Week 7 Sept. 12-16	How are cells organized to carry on the processes of life?	All living things are made of cells that perform functions necessary for life.	Students understand how proteins regulate the internal environment through communication and transport.	Flow chart of transcription through export. Connection with enzymes Notes/vocabulary/groups/articles/ lab
Week 8 Sept. 19-23	How are cells organized to carry on the processes of life?	All living things are made of cells that perform functions necessary for life.	Students understand the relationship between viruses and their host cells	Build a model of the interactions between a virus and a host cell. Notes/vocabulary/groups/articles /lab
Week 9 Sept. 26-30	<b>Make Up /Extensions</b>	<b>Recap Standards/Assessment review</b>	<b>Students self-analysis of major standards</b>	

## Biology II 2<sup>nd</sup> 9Weeks October 19<sup>th</sup> – December 18<sup>th</sup> 2016

Week	Topic	Standard	Objective	Major Assignments
Week 1 October 17 <sup>th</sup> - 21 <sup>st</sup>	How do living things interact with one another and the non-living elements of their environment?	All life is interdependent and interacts with the environment	Students analyze ecological impact due to climate change, human activity/population changes/non-native species.	Group research/presentations Notes/vocabulary/groups/articles/lab
Week 2 October 24 <sup>th</sup> – 28 <sup>th</sup>	How do living things interact with one another and the non-living elements of their environment?	All life is interdependent and interacts with the environment	Students investigate how fluctuations in population size in an ecosystem are determined.	Games that model Population fluctuations. Notes/vocabulary/groups/article/lab
Week 3 November 1 <sup>st</sup> - 4 <sup>th</sup>	How do living things interact with one another and the non-living elements of their environment?	All life is interdependent and interacts with the environment	Students investigate how human changes to the environment have led populations to adapt, migrate, or become extinct.	Group research/presentations Notes/vocabulary/groups/article/lab
Week 4 November 7 <sup>th</sup> – 11 <sup>th</sup>	How do living things interact with one another and the non-living elements of their environment?	All life is interdependent and interacts with the environment	Students contrast accommodations of individual organisms with the adaptation of a species	Group concept diagrams comparing accommodations. Notes/vocabulary/groups/article/lab
Week 5 November 14 <sup>th</sup> – 18 <sup>th</sup>	What are the scientific explanations for how matter cycles and energy flows through the biosphere?	Matter cycles and energy flows through the biosphere	Students describe role of biotic and abiotic factors in cycling of matter in the ecosystem, and explain how macromolecules are synthesized	Group discussion, Table write and Walk about. Notes/vocabulary/groups/article/lab
Week 6 November 21 <sup>st</sup> - 25 <sup>th</sup>	What are the scientific explanations for how matter cycles and energy flows through the biosphere?	Matter cycles and energy flows through the biosphere	Students explain how sunlight is captured by plant cells and converted to usable energy.	Concept map/ presentation Diagrams Notes/vocabulary/groups/article/lab
Week 7 Nov. 28 <sup>th</sup> – December 2 <sup>nd</sup>	What are the scientific explanations for how matter cycles and energy flows through the biosphere?	Matter cycles and energy flows through the biosphere	Students explain how mitochondria make stored chemical energy available to cells.	Concept map/ presentation Diagrams Notes/vocabulary/groups/article/lab
Week 8 December 5 <sup>th</sup> - 9 <sup>th</sup>	What are the scientific explanations for how matter cycles and energy flows through the biosphere?	Matter cycles and energy flows through the biosphere	Students analyze the role of ATP in the storage and release of cellular energy	Group discussion, Table write and Walk about. Lab Notes/vocabulary/groups/article
Week 9 December 12 <sup>th</sup> – 16 <sup>th</sup>	<b>Prepare for/Take Exams</b>	<b>Students self-analysis of major standards</b>	<b>Make Up /Extensions</b>	<b>Recap Standards/Assessment review</b>

## Biology II 3<sup>rd</sup> 9Weeks January 5th – March 4th 2017

Week	Topic	Standard	Objective	Major Assignments
Week 1 January 2 <sup>nd</sup> – 6 <sup>th</sup>	The mechanisms by which living things reproduce and transmit hereditary info. from parents to offspring	Organisms reproduce and transmit hereditary information.	Students describe how mutation and sexual reproduction contribute to genetic variation.	Group discussion, Table write and Walk about. Notes/vocabulary/groups/article/lab
Week 2 January 9 <sup>th</sup> – 13 <sup>th</sup>	The mechanisms by which living things reproduce and transmit hereditary info. from parents to offspring	Organisms reproduce and transmit hereditary information.	Students describe the relationship between phenotype and genotype and predict outcomes of genetic crosses based on Mendel's laws	Concept map/ present Diagrams/Notes/vocab/groups/article/lab
Week 3 January 16 <sup>th</sup> – 20 <sup>th</sup>	The mechanisms by which living things reproduce and transmit hereditary info. from parents to offspring	Organisms reproduce and transmit hereditary information.	Students explain the relationship among genes DNA code, proteins, and characteristics.	Concept map/ present Problem solving/Notes/vocabulary/groups/article/lab
Week 4 January 23 <sup>rd</sup> – 27 <sup>th</sup>	The mechanisms by which living things reproduce and transmit hereditary info. from parents to offspring	Organisms reproduce and transmit hereditary information.	Students explain how different properties of proteins are determined by amino acids	Concept map/ present Problem solving/Notes/vocabulary/groups/article/lab
Week 5 January 30 <sup>th</sup> – February 3 <sup>rd</sup>	The mechanisms by which living things reproduce and transmit hereditary info. from parents to offspring	Organisms reproduce and transmit hereditary information.	Students explain how the genetic makeup of cells can be engineered.	Group discussion, Table write and Walk about. Notes/vocabulary/groups/article/lab
Week 6 February 6 <sup>th</sup> – 10 <sup>th</sup>	How does natural selection explain how organisms have changed over time?	A rich variety and complexity of organisms have developed in response to changes in the environment.	Students identify factors that determine the frequency of an allele in the gene pool of a population.	Concept map/ present Problem solving Notes/vocabulary/groups/article/lab
Week 7 February 13 <sup>th</sup> – 17 <sup>th</sup>	How does natural selection explain how organisms have changed over time?	A rich variety and complexity of organisms have developed in response to changes in the environment.	Students recognize that natural selection acts on an organism's phenotype rather than its genotype.	Concept map/ present Problem solving Notes/vocabulary/groups/article/lab
Week 8 February 20 <sup>th</sup> – 24 <sup>th</sup>	How does natural selection explain how organisms have changed over time?	A rich variety and complexity of organisms have developed in response to changes in the environment.	Students determine how mutation, gen flow, and migration influence population structure.	Group research/ present Notes/vocabulary/groups/articles/lab
Week 9 February 27 <sup>th</sup> – March 3 <sup>rd</sup>	<b>Students self-analysis of major standards</b>	<b>Make Up /Extensions</b>	<b>Recap Standards/Assessment review</b>	

## Biology II 4<sup>th</sup> 9Weeks March 7<sup>th</sup> – May 26<sup>th</sup> 2017

Week	Topic	Standard	Objective	Major Assignments
Week 1 March 6 <sup>th</sup> – 10 <sup>th</sup>	In what ways are all living organisms similar and what makes a species unique?	All living organisms are both alike and different.	Students will investigate the unity and diversity among living things.	Group research/ present Notes/vocabulary/groups/ articles/lab
Week 2 March 13 <sup>th</sup> – 17 <sup>th</sup>	In what ways are all living organisms similar and what makes a species unique?	All living organisms are both alike and different.	Students will describe the events associated with reproduction from gamete production through birth.	Group research/ present Notes/vocabulary/groups/ articles/lab
Week 3 March 27 <sup>th</sup> – 31 <sup>st</sup>	In what ways are all living organisms similar and what makes a species unique?	All living organisms are both alike and different.	Students will develop a representation of the different germ layers and the tissue type into which they develop.	Group discussion, Table write and Walk about. Notes/vocabulary/groups/ article/lab
Week 4 April 3 <sup>rd</sup> – 7 <sup>th</sup>	In what ways are all living organisms similar and what makes a species unique?	All living organisms are both alike and different.	Students will compare the anatomy and physiology of representative animal phyla.	Concept map/ present Diagrams/Notes/vocab/ groups/article/lab
Week 5 April 10 <sup>th</sup> – 14 <sup>th</sup>	What conditions are needed for plants to grow and reproduce?	Plants are essential for life to exist.	Students will describe plant types based on their anatomy and physiology and investigate the relationship between form and function in major plant structures.	Group research/ present Use a dichotomous key to identify plants Notes/vocabulary/groups/ articles/lab
Week 6 April 17 <sup>th</sup> – 21 <sup>st</sup>	What conditions are needed for plants to grow and reproduce?	Plants are essential for life to exist.	Students will examine the anatomical and physiological differences between plants and their growth, reproduction, survival, and coevolution.	Concept map/ present Diagrams/Notes/vocab/ groups/article/Lab(design an experiment)
Week 7 April 24 <sup>th</sup> – 28 <sup>th</sup>	What conditions are needed for plants to grow and reproduce?	Plants are essential for life to exist.	Students will describe the difference between plants and fungi.	Group discussion, Table write and Walk about. Notes/vocabulary/groups/ article/lab
Week 8 May 1 <sup>st</sup> – 5 <sup>th</sup>	What conditions are needed for plants to grow and reproduce?	Plants are essential for life to exist.	Students will investigate the impact of plants on humans.	Group research/ present Notes/vocabulary/groups/ articles/lab design
Week 9 May 8 <sup>th</sup> – 12 <sup>th</sup> May 15 <sup>th</sup> -19 <sup>th</sup> May 22 <sup>th</sup> -26 <sup>th</sup>	<b>Prepare for/Take Exams</b>	<b>Students self-analysis of major standards</b>	<b>Make Up /Extensions</b>	<b>Recap Standards/ Assessment review</b>

***The teacher reserves the right to make changes as necessary.***

# Syllabus

## Chemistry I ( standard and honors)

### *August 1-August 19 – Weeks 1-3 – Introduction to chemistry, matter, and mathematics of chemistry*

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>.</p> <p>CLE 3221.1.2 Analyze the organization of the modern periodic table</p> <p>.</p> <p>CLE 3221.3.4 Explain the law of conservation of mass/energy.</p> <p>CLE 3221.2.1 Investigate the characteristic properties of matter.</p> <p>All inquiry, T/E and math standards</p>	<p>I can apply the periodic table to determine the number of protons and electrons in a neutral atom.</p> <p>I can identify a material as an element, compound or mixture; identify a mixture as homogeneous or heterogeneous; and/or identify a mixture as a solution, colloid or suspension.</p> <p>I can use the periodic table to identify an element as a metal, nonmetal, or metalloid.</p> <p>I can classify properties and changes in matter as physical, chemical, or nuclear</p> <p>I can use particle spacing diagrams to identify solids, liquids, or gases.</p> <p>I can convert between the following quantities of a substance: mass, number of moles, number of particles, and molar volume.</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted.</p>

## August 22- September 9 – Weeks 4-6 – Atomic theory and Structure

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.1.1 Compare and contrast historical models of the atom</p> <p>CLE 3221.1.2 Analyze the organization of the modern periodic table</p> <p>CLE 3221.1.3 Describe an atom in terms of its composition and electron characteristics</p> <p>All inquiry, T/E and math standards</p>	<p>I can identify the contributions of major atomic theorists: Bohr, Chadwick, Dalton, Planck, Rutherford, and Thomson</p> <p>I can compare the Bohr model and the quantum mechanical electron-cloud models of the atom.</p> <p>I can draw Bohr models of the first 18 elements.</p> <p>I can interpret a Bohr model of an electron moving between its ground and excited states in terms of the absorption or emission of energy. I can use the periodic table to identify an element as a metal, nonmetal, or metalloid.</p> <p>I can determine the number of protons and neutrons for a particular isotope of an element</p> <p>I can apply the periodic table to determine the number of protons and electrons in a neutral atom.</p> <p>I can explain the formation of anions and cations, and predict the charge of an ion formed by the main-group elements.</p> <p>I can determine an atom's Lewis electron-dot structure or number of valence electrons from an element's atomic number or position in the periodic table.</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

	<p>I can represent an atom's electron arrangement in terms of orbital notation, electron configuration notation, and electron dot notation.</p> <p>I can compare s and p orbitals in terms of their shape, and order the s, p, d and f orbitals in terms of energy and number of possible electrons.</p>	
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### September 12- September 23 – Weeks 7-8 – Nuclear Reactions

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.2.1 Investigate the characteristic properties of matter.</p> <p>CLE 3221.2.2 Explore the interactions between matter and energy.</p> <p>CLE 3221.3.2 Analyze chemical and nuclear reactions.</p> <p>CLE 3221.3.4 Explain the law of conservation of mass/energy.</p> <p>All inquiry, T/E and math standards</p>	<p>I can determine the number of protons and neutrons for a particular isotope of an element.</p> <p>I can classify properties and changes in matter as physical, chemical, or nuclear.</p> <p>I can write the nuclear equation involving alpha or beta particles based on the mass number of the parent isotope and</p> <p>I can determine the half-life of an isotope by examining a graph or with an appropriate equation.</p> <p>I can write a balanced nuclear equation to compare nuclear fusion and fission.</p> <p>I can describe the benefits and hazards of nuclear energy</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

**September 26- September 30 – Weeks 8– Periodic Properties and Trends**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.1.2 Analyze the organization of the modern periodic table.</p> <p>All inquiry, T/E and math standards</p>	<p>I can use the periodic table to identify an element as a metal, nonmetal, or metalloid</p> <p>I can sequence selected atoms from the main-group elements based on their atomic or ionic radii.</p> <p>I can sequence selected atoms from the main-group elements based on first ionization energy, electron affinity, or electronegativity.</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

**October 17-November 4 – Weeks 9-11 – ionic and covalent compounds**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.1.2 Analyze the organization of the modern periodic table</p> <p>CLE 3221.1.3 Describe an atom in terms of its composition and electron characteristics</p> <p>CLE 3221.2.1 Investigate the characteristic properties of matter.</p> <p>CLE 3221.3.1 Investigate chemical bonding</p> <p>All inquiry, T/E and math standards</p>	<p>I can explain the formation of anions and cations, and predict the charge of an ion formed by the main-group elements</p> <p>I can determine an atom's Lewis electron-dot structure or number of valence electrons from an element's atomic number or position in the periodic table.</p> <p>I can determine the type of chemical bond that occurs in a chemical compound.</p> <p>I can differentiate between ionic and</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

	<p>covalent bond models.</p> <p>I can identify the chemical formulas of common chemical compounds.</p> <p>I can employ a table of polyvalent cations and polyatomic ions to name and describe the chemical formula of ionic compounds.</p>	
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**November 7– November 22 Weeks 12-14– Chemical reactions**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.2.1 Investigate the characteristic properties of matter.</p> <p>CLE 3221.3.1 Investigate chemical bonding.</p> <p>CLE 3221.3.2 Analyze chemical and nuclear reactions.</p> <p>CLE 3221.3.3 Explore the mathematics of chemical formulas and equations.</p> <p>CLE 3221.3.4 Explain the law of conservation of mass/energy</p> <p>All inquiry, T/E and math standards</p>	<p>I can classify properties and changes in matter as physical, chemical, or nuclear.</p> <p>I can identify the chemical formulas of common chemical compounds.</p> <p>I can employ a table of polyvalent cations and polyatomic ions to name and describe the chemical formula of ionic compounds.</p> <p>I can balance an equation for a chemical reaction.</p> <p>I can classify a chemical reaction as composition, decomposition, single replacement, double replacement, and combustion.</p> <p>I can use activity series or solubility product table information to predict the products of a chemical reaction.</p> <p>I can identify a substance as an acid or base according to its formula</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

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**November 28-December 2 – Weeks 17 – percent composition and empirical/ molecular formulas**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.3.3 Explore the mathematics of chemical formulas and equations.</p> <p>CLE 3221.3.4 Explain the law of conservation of mass/energy</p> <p>All inquiry, T/E and math standards</p>	<p>I can classify properties and changes in matter as physical, chemical, or nuclear.</p> <p>I can convert percent composition information into the empirical or molecular formula of a compound.</p> <p>I can apply information about the molar mass, number of moles, and molar volume to the number of particles of the substance.</p> <p>I can convert between the following quantities of a substance: mass, number of moles, number of particles, and molar volume at STP.</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

**December 5- December 9 – Week 18 – Semester Review and Exam review**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>

**January 3- January 20 – weeks 19-21 – Chemical Quantities and Stoichiometry**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.3.3 Explore the mathematics of chemical formulas and equations</p> <p>CLE 3221.3.4 Explain the law of conservation of mass/energy.</p> <p>All inquiry, T/E and math standards</p>	<p>I can convert percent composition information into the empirical or molecular formula of a compound.</p> <p>I can apply information about the molar mass, number of moles, and molar volume to the number of particles of the substance.</p> <p>I can balance an equation for a chemical reaction.</p> <p>I can interpret a chemical equation to determine molar ratios.</p> <p>I can convert between the following quantities of a substance: mass, number of moles, number of particles, and molar volume at STP.</p> <p>I can solve different types of stoichiometry problems (e.g., volume at STP to mass, moles to mass, molarity).</p> <p>I can determine the amount of expected product in an experiment and calculate percent yield.</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

	I can identify the chemical formulas of common chemical compounds.	
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### January 23- February 10 – Weeks 22-24 – States of Matter /Thermochemistry

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.2.2 Explore the interactions between matter and energy</p> <p>CLE 3221.2.3 Apply the kinetic molecular theory to describe solids, liquids, and gases.</p> <p>CLE 3221.2.4 Investigate characteristics associated with the gaseous state.</p> <p>CLE 3221.2.5 Discuss phase diagrams of onecomponent systems.</p> <p>CLE 3221.3.4 Explain the law of conservation of mass/energy</p> <p>All inquiry, T/E and math standards</p>	<p>I can describe how to prepare solutions of given concentrations expressed in units of ppm, ppb, molarity, molality, and percent composition.</p> <p>I can use calorimetry to: identify unknown substances through specific heat, determine the heat changes in physical and chemical changes, determine the mass of an object, and determine the change in temperature of a material.</p> <p>I can perform calculations on heat of solvation, heat of reaction, and heat of formation, and heat of phase change.</p> <p>I can Use particle spacing diagrams to identify solids, liquids, or gases.</p> <p>I can distinguish among solid, liquid, and gaseous states of a substance in terms of the relative kinetic energy of its particles.</p> <p>I can use a phase diagram to correlate changes in temperature and energy with phases of matter.</p> <p>I can graph and interpret the results of</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

	experiments that explore relationships among pressure, temperature, and volume of gases.	
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### February 13- March 3 Weeks 25-27 – Water and Solutions

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.2.1 Investigate the characteristic properties of matter.</p> <p>CLE 3221.2.2 Explore the interactions between matter and energy.</p> <p>CLE 3221.2.3 Apply the kinetic molecular theory to describe solids, liquids, and gases.</p> <p>All inquiry, T/E and math standards</p>	<p>Identify the chemical formulas of common chemical compounds.</p> <p>I can identify a material as an element, compound or mixture; identify a mixture as homogeneous or heterogeneous; and/or identify a mixture as a solution, colloid or suspension.</p> <p>I can identify the solute and solvent composition of a solid, liquid or gaseous solution.</p> <p>I can express the concentration of a solution in units of ppm, ppb, molarity, molality, and percent composition.</p> <p>I can describe how to prepare solutions of given concentrations expressed in units of ppm, ppb, molarity, molality, and percent composition.</p> <p>I can investigate factors that affect the rate of solution.</p> <p>I can describe how to prepare a specific dilution from a solution of known molarity.</p> <p>I can determine the colligative</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

	<p>properties of a solution based on the molality and freezing point or boiling points of the solvent.</p> <p>I can use a solubility graph, composition of a solution and temperature to determine if a solution is saturated, unsaturated or supersaturated.</p> <p>I can classify properties and changes in matter as physical, chemical, or nuclear</p> <p>I can identify the chemical formulas of common chemical compounds.</p> <p>I can employ a table of polyvalent cations and polyatomic ions to name and describe the chemical formula of ionic compounds.</p> <p>I can balance an equation for a chemical reaction</p> <p>I can solve different types of stoichiometry problems (e.g., volume at STP to mass, moles to mass, molarity).</p>	
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### March 6- April 7 – Weeks 28-31 – Gases

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.2.3 Apply the kinetic molecular theory to describe solids, liquids, and gases.</p> <p>CLE 3221.2.4 Investigate characteristics associated with the gaseous state.</p> <p>All inquiry, T/E and math standards</p>	<p>I can use particle spacing diagrams to identify solids, liquids, or gases.</p> <p>I can Distinguish among solid, liquid, and gaseous states of a substance in terms of the relative kinetic energy of its particles.</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

	<p>I can graph and interpret the results of experiments that explore relationships among pressure, temperature, and volume of gases.</p> <p>I can solve gas law problems.</p> <p>I can apply information about the molar mass, number of moles, and molar volume to the number of particles of the substance.</p>	
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**April 10-April 21- Weeks 32-33- Acids, bases and salts**

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3221.2.2 Explore the interactions between matter and energy.</p> <p>CLE 3221.2.3 Apply the kinetic molecular theory to describe solids, liquids, and gases</p> <p>CLE 3221.3.2 Analyze chemical and nuclear reactions.</p> <p>CLE 3221.3.3 Explore the mathematics of chemical formulas and equations.</p> <p>CLE 3221.3.4 Explain the law of conservation of mass/energy</p> <p>All inquiry, T/E and math standards</p>	<p>I can investigate factors that affect the rate of solution</p> <p>I can use activity series or solubility product table information to predict the products of a chemical reaction.</p> <p>I can predict the products of a neutralization reaction involving inorganic acids and bases.</p> <p>I can identify a substance as an acid or base according to its formula</p> <p>I can investigate the acidity/basicity of substances with various indicators.</p>	<p>Written formative assessments evaluating student's progress toward mastery of standards will be provided.</p> <p>Laboratory investigations related to topics will be conducted</p>

**April 24-28 – week 34 – EOC review**

**After EOC Remaining work for the year will be at individual teacher's discretion**



# Syllabus

## Physics Honors

### Unit 1: Motion in One Dimension

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3231.1.1 Investigate fundamental physical quantities of length, mass, and time.</p> <p>CLE 3231.1.2 Analyze and apply Newton's three laws of motion.</p>	<p>Explore displacement, velocity, and acceleration            Average Velocity: <math>v_{av} = (d_f - d_i) / (t_f - t_i)</math>; Final Velocity: <math>v_f = v_i + a\Delta t</math>; Final Velocity of Falling object: <math>v_f = v_i + g\Delta t</math>;            Average Acceleration: <math>a_{av} = (v_f - v_i) / (t_f - t_i)</math>;            Displacement of Falling object: <math>d = v_i \Delta t + (1/2) a \Delta t^2</math> ; Displacement of Falling object: <math>\Delta d = v_i \Delta t + (1/2)g \Delta t^2</math> .            Explore characteristics of rectilinear motion and create displacement-time graphs (velocity), velocity-time graphs (acceleration and distance).</p>	<p>Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Unit 2: Motion in Two Dimensions

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3231.1.2 Analyze and apply Newton's three laws of motion.</p>	<p>\ 3231.1.2 Analyze vector diagrams and solve composition and resolution problems for force and momentum.            \ 3231.1.6 Investigate projectile motion. Parabolic Equations with the Quadratic Formula            \ 3231.1.10 Utilize trigonometry and vector analysis to solve force and momentum problems [Sine, Cosine, Tangent Functions, Law of Sines, and Law of Cosines].</p>	<p>Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

### Unit 3: Forces and the Laws of Motion

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3231.1.2 Analyze and apply Newton's three laws of motion.</p> <p>CLE 3231.1.4 Investigate kinematics and dynamics</p>	<p>3231.1.3 Explore characteristics of rectilinear motion and create displacement-time graphs (velocity), velocity-time graphs (acceleration and distance). CLE 3231.1.2 Analyze and apply Newton's three laws of motion.</p> <p>3231.1.5 Evaluate the dynamics of systems in motion including friction, gravity, impulse and momentum, change in momentum, and conservation of momentum. Coefficient of Friction: <math>\mu = F_f/F_N</math>; Law of Universal Gravitation: <math>F_G = (G m_1 m_2)/d^2</math>; Impulse: <math>F\Delta t = m\Delta t</math></p> <p>3231.1.14 Associate time with the independent variable in most experiments.</p> <p>3231.1.15 Relate inertia, force, or action-reaction forces to Newton's three laws of motion.</p> <p>3231.1.16 Compare, contrast, and apply characteristic properties of scalar and vector quantities.</p>	

#### Unit 4: Work and Energy

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
<p>CLE 3231.1.3 Understand work, energy, and power.</p>	<p>3231.1.17 Investigate the definitions of force, work, power, kinetic energy, and potential energy.</p> <p>Force: <math>F = ma</math>;  Work: <math>W = Fd</math>;  Power: <math>P = (F\Delta d)/\Delta t</math>;  Kinetic Energy: <math>E_K = 0.5mv^2</math>;  Potential Energy: <math>E_P = mg\Delta h</math></p> <p>3231.1.18 Analyze the characteristics of energy, conservation of energy including friction, and gravitational potential energy</p>	<p>Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.</p>

	<p>[Gravitational Potential Energy: <math>E_p = mg\Delta h</math>].</p> <p>3231.1.19 Relate work and power to various simple machines, mechanical advantage of different machines, and recognize simple machines that are combined to form compound machines</p> <p>Work: <math>W = F\Delta d</math>; Power: <math>P = (F\Delta d)/\Delta t</math>; Efficiency = <math>(W_{OUT}/W_{IN}) \times 100\%</math>.</p>	
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### Unit 5: Momentum and Collisions

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
CLE 3231.1.4 Investigate kinematics and dynamics.	<p>3231.1.12 Experiment with elastic and inelastic collisions Elastic : <math>m_1v_1 + m_2v_2 = m_1v_3 + m_2v_4</math>; Inelastic: <math>m_1v_1 + m_2v_2 = (m_1 + m_2)v_3</math></p>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments.

### Unit 6: Circular Motion and Gravitation

<i>Standards</i>	<i>Objectives</i>	<i>Major Assignments</i>
CLE 3231.1.4 Investigate kinematics and dynamics	<p>3231.1.15 Relate inertia, force, or action-reaction forces to Newton's three laws of motion.</p> <p>3231.1.20 Describe rotational equilibrium and relate this factor to torque Rotational Inertia: <math>T = I\alpha</math>; Torque: <math>T = Fr</math></p>	Major assignments will include labs, daily formative assessments, and unit formative and summative assessments

## Unit 7: Fluid Mechanics

Standards	Objectives	Major Assignments
<p>CLE 3231.1.5 Investigate and apply Archimedes's Principle.</p> <p>CLE 3231.1.6 Explore Pascal's Principle.</p> <p>CLE 3231.1.7 Develop an understanding of Bernoulli's Principle and its applications.</p>	<p>3231.1.21 Determine the magnitude of the buoyant force exerted on a floating object or a submerged object (<math>F_B = mfg = f \rho Vfg</math>).</p> <p>3231.1.22 Investigate the apparent weight of an object submerged in a fluid (<math>F_{net} = F_B - F_g</math>).</p> <p>3231.1.23 Explain, in terms of force and/or density, why some objects float and some objects sink.</p> <p>3231.1.24 Calculate the pressure exerted by a fluid according to Pascal's Principle (<math>P_{inc} = F_1/A_1 = F_2/A_2</math>).</p> <p>3231.1.25 Calculate how pressure varies with water depth (<math>P = P_0 + \rho gh</math>).</p> <p>3231.1.26 Examine the motion of a fluid using the continuity equation (<math>A_1v_1 = A_2v_2</math>).</p> <p>3231.1.27 Recognize the effects of Bernoulli's principle on fluid motion and its applications (i.e. lift, curve balls, and wind around/over object)</p>	<p>Major assignments will include labs, daily formative assessments, and unit formative and summative assessments</p>

Other instructional resources may be accessed upon request.