



Essential Outcomes Chart: What is it we expect students to learn?

<b>GRADE:</b> 9	<b>SUBJECT:</b> <i>Biology</i>	<b>SEMESTER:</b> 1 & 2	<b>TEAM MEMBERS:</b> Coyne, Lopez, Lor, Martinez, Perez, Yamuni
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Science & Engineering Practices (SEP)	Crosscutting Concepts (CCC)	Disciplinary Core Ideas (DCI) Domains
<ol style="list-style-type: none"> <li>Asking questions (for science) &amp; defining problems (for engineering)</li> <li>Developing &amp; using models</li> <li>Planning &amp; carrying out investigations</li> <li>Analyzing &amp; interpreting data</li> <li>Using mathematics &amp; computational thinking</li> <li>Constructing explanations (for science) &amp; designing solutions (for engineering)</li> <li>Engaging in argument from evidence</li> <li>Obtaining, evaluating, &amp; communicating information</li> </ol>	<ol style="list-style-type: none"> <li>Patterns, similarity, and diversity</li> <li>Cause and effect</li> <li>Scale, proportion and quantity</li> <li>Systems and system models</li> <li>Energy and matter</li> <li>Structure and function</li> <li>Stability and change</li> </ol>	<ol style="list-style-type: none"> <li>Physical Sciences</li> <li>Life Science</li> <li>Earth and Space Sciences</li> <li>Engineering, Technology &amp; Applications of Science</li> </ol>

	STANDARD DESCRIPTION	EXAMPLE RIGOR	PREREQUISITE / CONCURRENT / EXISTING SKILLS	COMMON ASSESSMENT	WHEN TAUGHT?	EXTENSION STANDARDS
	What is the essential standard to be learned? Describe in student-friendly vocabulary.	What does proficient student work look like? Provide an example and/or description.	What prior / concurrent / existing knowledge, skills, and/or vocabulary is/are needed for a student to master this standard?	What assessment(s) will be used to measure student mastery?	When will this standard be taught?	What will we do when students have learned the essential standard(s)?

## Instructional Segment 0: Science Skills

<p><b>Instructional Segment 0</b> <b>Science Skills--</b> <b>SEP 1-6</b> <b>CCC 1-4</b> <b>DCI 1-4</b></p>	<p><b>E.O. 1</b> <b>The Scientific Method</b></p> <p>SEP 1, SEP 2, SEP 3, SEP 4, SEP 5, SEP 6, SEP 7, SEP 8</p> <p>Students will carry out the steps of the Scientific Method through Investigation &amp; Experimentation including: designing experiments, creating hypotheses, collecting &amp; analyzing data, then developing</p>	<p>Students can <b>plan</b> &amp; <b>conduct</b> an <b>investigation</b> individually &amp; collaboratively to <b>produce</b> data to serve as the basis for evidence, in the design: <b>decide</b> on types, how much, and accuracy of data needed to <b>produce</b> reliable measurements and <b>consider</b> limitations on the precision of the data (e.g., number of trials, time), and <b>refine</b> the <b>design</b> accordingly. Engage in trial and error.</p>	<p><b>Common Content Key Terms or Vocabulary for each standard:</b></p> <ul style="list-style-type: none"> <li>Variable: Independent &amp; Dependent</li> <li>Hypothesis</li> <li>Data</li> <li>Observation</li> </ul> <p><b>Academic Vocabulary</b></p> <ul style="list-style-type: none"> <li>Describe</li> <li>Compare</li> <li>Contrast</li> <li>Differentiate</li> <li>Explain</li> </ul> <p><b>Focused note taking Paragraph Summaries</b></p> <ul style="list-style-type: none"> <li>CER Organizer</li> <li>CER Summary</li> </ul> <p><b>Differentiated Critical Reading Strategies</b> <b>Steps of the Scientific Method</b> <b>Microscope Technique</b></p>	<p><b>Informal &amp; Formal Assessments</b></p> <ul style="list-style-type: none"> <li>Student Portfolios &amp; or Interactive Notebooks</li> <li>CER(Claim, Evidence, Reasoning)/ Summary Paragraphs</li> <li>Differentiated Critical Reading</li> <li>Inquiry Labs</li> <li>Lab Reports</li> <li>Common Formative Assessments</li> <li>Common District Summative Assessments</li> </ul>	<p><b>Quarter 1 &amp; Ongoing during the Course</b></p>	<p><b>Extension Activities / HONOR'S</b></p> <ul style="list-style-type: none"> <li>Projects that are standard specific</li> <li>Enrichment activities</li> <li>Additional Critical Reading / literature readings related to the standard</li> <li>Virtual Labs</li> <li>Graph Analysis using <b>AVID LENSES</b></li> <li>Design a Science Experiment</li> <li><b>CER:</b> Claim Evidence &amp; Reasoning Data Analysis</li> <li><b>POGIL:</b> <i>Process</i></li> </ul>
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data based conclusions.

**Through CER summary paragraphs, experimental design, lab analysis, evaluations, & process activities.**

**Metric Measurement using rulers, balances and glassware.**

**Conduct /Complete:**

- measurement
- Data Collection
- Data Analysis including finding averages
- sources of error
- Graph data using various forms of graphs

- *oriented guided inquiry learning*

# Instructional Segment 1: Ecosystem Interaction and Energy

**Segment 1:**  
Ecosystem Interactions and Energy

SEP 1-6  
CCC 1-5, 7  
DCI 1,2

**E.O. 2**  
*Ecology & Biodiversity*

HS LS 2-1  
Through HS LS 2-8 & HS LS-4-6  
LS 2.A through LS 2-D & LS 4.D  
SEP 1-4, 6-8  
Explain interactions and the movement of energy between organisms and the environment.

Students can **demonstrate** an ability to **investigate** the role of **biodiversity in ecosystems** and the role of **animal behavior** on survival of individuals and species. Students can **model interactions** among organisms and how those interactions influence the **dynamics of ecosystems**.

Students can **evaluate** and **adapt** existing **renewable and nonrenewable resources as they relate to ecological sustainability** through a research project and presentation.

Through CER summary paragraphs, lab analysis, evaluations, &

**Common Key Terms or Vocabulary for each standard**

- Resources
- Climate
- Cycles of matter
- Energy
- Nitrogen
- Atmosphere
- Hydrosphere
- Geosphere
- Physical change

**Academic Language**

- Describe
- Explain
- Differentiate
- Compare/Contrast
- Demonstrate
- Investigate

**Focused Note taking Paragraph Summaries**

- CER Organizer
- CER Summary

**Differentiated Critical Reading Strategies**

**Informal & Formal Assessments**

- Student Portfolios & or Interactive Notebooks
- CER(Claim, Evidence, Reasoning)/ Summary Paragraphs
- Differentiated Critical Reading
- Inquiry Labs
- Lab Reports
- Common Formative Assessments
- Common District Summative Assessments

**Semester 1 Quarter 1**

**Extension Activities / HONOR'S**

- Projects that are standard specific
- Enrichment activities
- Additional Critical Reading / literature readings related to the standard
- Virtual Labs
- Models
- **POGIL:** *Process oriented guided inquiry learning*
- **CER:** Claim Evidence & Reasoning Data Analysis

<p><b>Segment 2</b>  <b>History of Earth's Atmosphere: Photosynthesis &amp; Respiration</b>  <b>SEP 1-6</b>  <b>CCC 1-5, 7</b>  <b>DCI 1,2,3</b></p>	<p><b>E.O. 3</b>  <b>Introduction to Chemistry</b>  <b>PS 1.A, ESS 2.C, SEP 6 , HS-LS1-2</b></p> <p>Students can identify &amp; describe the components of atoms, ions &amp; molecules, describe the properties of water, determine the reactants and products, as well as recognize a chemical reaction in equilibrium, in the context of biological processes.</p>	<p><b>process activities.</b></p> <p>Students can analyze and interpret <b>Models</b> (e.g., physical, computer models) that <b>simulate</b> systems and interactions—including energy , matter, and information flows—within and between <b>systems</b>.</p> <p><b>Through Molecular Models, CER summary paragraphs, lab analysis, evaluations, &amp; process activities.</b></p>	<p><b>Common content Key Terms or Vocabulary for each standard</b></p> <ul style="list-style-type: none"> <li>• Molecules</li> <li>• Elements</li> <li>• Compounds</li> <li>• Amino acids</li> <li>• Carbon</li> <li>• Hydrogen</li> <li>• Oxygen</li> </ul> <p><b>Academic Language:</b></p> <ul style="list-style-type: none"> <li>• Describe</li> <li>• Explain</li> <li>• Differentiate</li> <li>• Compare/Contrast</li> </ul> <p><b>Focused Note taking Paragraph Summaries</b></p> <ul style="list-style-type: none"> <li>• CER Organizer</li> <li>• CER Summary</li> </ul> <p><b>Differentiated Critical Reading Strategies</b></p> <p><b>Parts of an Atom</b></p> <p><b>Properties of Periodic Table</b></p>	<p><b>Informal &amp; Formal Assessments</b></p> <ul style="list-style-type: none"> <li>• Student Portfolios &amp; or Interactive Notebooks</li> <li>• CER(Claim, Evidence, Reasoning)/ Summary Paragraphs</li> <li>• Differentiated Critical Reading</li> <li>• Inquiry Labs</li> <li>• Lab Reports</li> <li>• Common Formative Assessments</li> <li>• Common District Summative Assessments</li> </ul>	<p><b>Semester 1 Quarter 1</b></p>	<p><b>Extension Activities / HONOR'S</b></p> <ul style="list-style-type: none"> <li>• Projects that are standard specific</li> <li>• Enrichment activities</li> <li>• Additional Critical Reading / literature readings related to the standard</li> <li>• Virtual Labs</li> <li>• Models</li> <li>• <b>POGIL:</b> <i>Process oriented guided inquiry learning</i></li> <li>• <b>CER:</b> Claim Evidence &amp; Reasoning Data Analysis</li> </ul>
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# Instructional Segment 2

## History of Earth's Atmosphere: Photosynthesis and Respiration

<p><b>Segment 2</b> History of Earth's Atmosphere: Photosynthesis &amp; Respiration SEP 1-6 CCC 1-7 DCI 1,2,3</p>	<p><b>E.O. 4</b> Biochemistry: Carbon- based molecules HS LS 1-6 Identify and describe the composition of the 4 carbon based biological molecules and how they interact in the systems of living things.</p>	<p>Students can <b>Construct</b> and <b>revise</b> an <b>explanation based on evidence</b> for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.  Through CER summary paragraphs, lab analysis, evaluations, &amp; process activities.</p>	<p>Common content Key Terms or Vocabulary for each standard</p> <ul style="list-style-type: none"> <li>• Molecules</li> <li>• Elements,</li> <li>• Amino acids</li> <li>• Carbon</li> <li>• Hydrogen</li> <li>• Oxygen</li> <li>• Nitrogen</li> <li>• Phosphorus</li> <li>• catalyst</li> </ul> <p><b>Academic Language</b></p> <ul style="list-style-type: none"> <li>• Model</li> <li>• Construct</li> <li>• Revise</li> <li>• Describe</li> <li>• Explain</li> <li>• Differentiate</li> <li>• Compare/Contrast</li> </ul> <p><b>Focused Note taking Paragraph Summaries</b></p> <ul style="list-style-type: none"> <li>• CER Organizer</li> <li>• CER Summary</li> </ul> <p><b>Differentiated Critical Reading Strategies</b></p>	<p><b>Informal &amp; Formal Assessments</b></p> <ul style="list-style-type: none"> <li>• Student Portfolios &amp; or Interactive Notebooks</li> <li>• CER(Claim, Evidence, Reasoning)/ Summary Paragraphs</li> <li>• Differentiated Critical Reading</li> <li>• Inquiry Labs</li> <li>• Lab Reports</li> <li>• Common Formative Assessments</li> <li>• Common District Summative Assessments</li> </ul>	<p><b>Semester 1 Quarter 2</b></p>	<p><b>Extension Activities / HONOR'S</b></p> <ul style="list-style-type: none"> <li>• Projects that are standard specific</li> <li>• Enrichment activities</li> <li>• Additional Critical Reading / literature readings related to the standard</li> <li>• Enzyme Catalyst Activity</li> <li>• Virtual Labs</li> <li>• Models</li> <li>• <b>POGIL:</b> <i>Process oriented guided inquiry learning</i></li> <li>• <b>CER:</b> Claim Evidence &amp; Reasoning Data Analysis</li> </ul>
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### Essential Guiding Questions

- How do living things acquire energy and matter for life?
- How do organisms store energy?
- How are photosynthesis and cellular respiration connected?
- How do organisms use the raw materials they ingest from the environment?
- How has the cycling of energy and matter changed over Earth's history?

<p><b>Segment 2</b></p> <p><b>History of Earth's Atmosphere: Photosynthesis &amp; Respiration</b></p> <p><b>SEP 1-6</b> <b>CCC 1-7</b> <b>DCI 1,2,3</b></p>	<p><b>E.O. 5</b> <b>Cell Energy: Photosynthesis &amp; Respiration</b></p> <p><b>HS LS 1-2, HS LS1-7, HS LS 2-3</b></p> <p>Model the chemical reaction of the photosynthesis process.</p> <p>Describe the process of transforming sugars into cellular energy.</p>	<p><b>Students can describe</b> the main way that energy is cycled from solar energy, into producers, and through consumers, <b>using the components of the carbon cycle</b>, in which carbon is exchanged among the biosphere, atmosphere, oceans, and geosphere to maintain life on Earth, <b>especially through cellular respiration and photosynthesis.</b></p> <p><b>Through CER summary paragraphs, lab analysis, evaluations, &amp; process activities.</b></p>	<p><b>Common Key Content Terms or Vocabulary for each standard</b></p> <ul style="list-style-type: none"> <li>• Light energy</li> <li>• Chemical energy</li> <li>• Chemical process</li> <li>• Bonds</li> <li>• Compounds</li> <li>• Product / Output</li> <li>• Reactant / Input</li> </ul> <p><b>Academic Language</b></p> <ul style="list-style-type: none"> <li>• Describe</li> <li>• Explain</li> <li>• Differentiate</li> <li>• Compare/Contrast</li> <li>• Construct</li> <li>• Model</li> <li>• Replicate</li> </ul> <p><b>Focused Note taking Paragraph Summaries</b></p> <ul style="list-style-type: none"> <li>• CER Organizer</li> <li>• CER Summary</li> </ul> <p><b>Differentiated Critical Reading Strategies</b></p>	<p><b>Informal &amp; Formal Assessments</b></p> <ul style="list-style-type: none"> <li>• Student Portfolios &amp; or Interactive Notebooks</li> <li>• CER(Claim, Evidence, Reasoning)/ Summary Paragraphs</li> <li>• Differentiated Critical Reading</li> <li>• Inquiry Labs</li> <li>• Lab Reports</li> <li>• Common Formative Assessments</li> <li>• Common District Summative Assessments</li> </ul>	<p><b>Semester 1 Quarter 2</b></p>	<p><b>Extension Activities / HONOR'S</b></p> <ul style="list-style-type: none"> <li>• Projects that are standard specific</li> <li>• Enrichment activities</li> <li>• Additional Critical Reading / literature readings related to the standard</li> <li>• Virtual Labs</li> <li>• Models</li> <li>• <b>POGIL: Process oriented guided inquiry learning</b></li> <li>• <b>CER: Claim Evidence &amp; Reasoning Lab Data Analysis</b></li> </ul>
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<p><b>Essential Guiding Questions</b></p> <ul style="list-style-type: none"> <li>□ How do living things acquire energy and matter for life?</li> <li>□ How do organisms store energy?</li> <li>□ How are photosynthesis and cellular respiration connected?</li> <li>□ How do organisms use the raw materials they ingest from the environment?</li> <li>□ How has the cycling of energy and matter changed over Earth's history?</li> </ul>
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## Segment 3: Evidence of Evolution

### Segment 3

Evidence of Evolution

SEP 1-6

CCC 1-4

DCI 1,2,3

### E.O 7

*History of Earth's Atmosphere & Biosphere*

HS-LS1-2.

Explain how the plates/structure of the Earth have changed over time.

Explain how living things are classified phylogenetically.

Students can **model** and **analyze** theory of plate tectonics and continental drift as it relates the evolution of the atmosphere and biosphere of planet Earth. Students can **classify** organisms using a dichotomous key. Students can **construct** and **analyze** a cladogram.

Through CER summary paragraphs, lab analysis dichotomous key classification, cladograms & process activities.

**Common Content Key Terms or Vocabulary for each standard**

- Continental Drift
- Plate tectonics
- Phylogeny
- Cladogram
- Dichotomous Key
- Continental & Oceanic PLATES
- Mantle
- Inner & Outer Core
- Convection Current
- Divergent & Convergent Boundaries

**Academic Language**

- Describe
- Explain
- Differentiate
- Compare/Contrast
- Develop
- Illustrate

**Focused Note taking Paragraph Summaries**

- CER Organizer
- CER Summary

**Differentiated Critical Reading Strategies**

**Informal & Formal Assessments**

- Student Portfolios & or Interactive Notebooks
- CER(Claim, Evidence, Reasoning)/ Summary Paragraphs
- Differentiated Critical Reading
- Inquiry Labs
- Lab Reports
- Common Formative Assessments
- Common District Summative Assessments

**Semester 2 Quarter 3**

**Extension Activities / HONOR'S**

- Projects that are standard specific
- Enrichment activities
- Additional Critical Reading / literature readings related to the standard
- Virtual Labs
- AP Extension activities
- **POGIL:** *Process oriented guided inquiry learning*
- **CER:** Claim Evidence & Reasoning Data Analysis



## Essential Guiding Questions

- How do layers of rock form and how do they contain fossils?
- Why do we see similar fossils across the world from each other but living organisms that are very different?
- What evidence shows that different species are related?
- How did modern day humans evolve?

### Segment 3

Evidence of Evolution  
**SEP 1-6**  
**CCC 1-4**  
**DCI 1,2,3,4**

**E.O. 8**  
*Biological Evolution: Unity & Diversity*

HS-LS-4-1 through 4-6 & HS-LS3-3

Describe how all living things are related and how they have changed over time

Students can **Model** the relationships that exist between different species and **illustrate** how the development of different adaptations has led to increased speciation.  
**Through CER summary paragraphs, lab analysis, evaluations, & process activities.**

**Common Content Key Terms or Vocabulary for each standard,**

- Evolution
- Adaptation
- Natural Selection
- Artificial Selection
- Fitness
- Variation
- Overproduction
- Descent with Modification
- Inheritance

**Academic Language**

- Describe
- Explain
- Differentiate
- Compare/Contrast
- Model
- Illustrate

**Focused Note taking Paragraph Summaries**

- CER Organizer
- CER Summary

**Differentiated Critical Reading Strategies**

**Informal & Formal Assessments**

- Student Portfolios & or Interactive Notebooks
- CER(Claim, Evidence, Reasoning)/ Summary Paragraphs
- Differentiated Critical Reading
- Inquiry Labs
- Lab Reports
- Common Formative Assessments
- Common District Summative Assessments

**Semester 2 Quarter 3**

**Extension Activities / HONOR'S**

- Projects that are standard specific
- Enrichment activities
- Additional Critical Reading / literature readings related to the standard
- Virtual Labs
- **POGIL:** *Process oriented guided inquiry learning*
- **CER:** Claim Evidence & Reasoning Data Analysis

## Essential Guiding Questions

- How do layers of rock form and how do they contain fossils?
- Why do we see similar fossils across the world from each other but living organisms that are very different?
- What evidence shows that different species are related?
- How did modern day humans evolve?

## Segment 4: Inheritance of Traits

**Segment 4**  
**Inheritance**  
**of Traits**  
**SEP 1-6**  
**CCC 1-4, 6**  
**DCI 1,2,3,4**

**E.O. 9**  
**Inheritance &**  
**Variation of**  
**Traits**

HS-LS3-1, 3-2 &  
 3-3

Explain how monohybrid and dihybrid traits are passed from parents to offspring and create and analyze pedigree charts

**Students can** explain the mechanisms of genetic inheritance and describe the environmental and genetic causes of gene mutation and the alteration of gene expression.

**Through CER** summary paragraphs, lab analysis, Punnett square construction and analysis, evaluations, & process activities.

**Common Content Key** Terms or Vocabulary for each standard

- Characteristic
- Homozygous
- Heterozygous
- Dominant
- Recessive
- Phenotype
- Genotype
- Traits
- Replication
- Environmental factors
- Viable errors

**Academic Language**

- Describe
- Explain
- Differentiate
- Compare/Contrast
- Determine
- Develop

**Focused Note taking**  
**Paragraph Summaries**

- CER Organizer
- CER Summary

**Differentiated Critical**  
**Reading Strategies**

**Informal & Formal** Assessments

- Student Portfolios & or Interactive Notebooks
- CER(Claim, Evidence, Reasoning)/ Summary Paragraphs
- Differentiated Critical Reading
- Inquiry Labs
- Lab Reports
- Common Formative Assessments
- Common District Summative Assessments

**Semester 2**  
**Quarter 3**

**Extension Activities /**  
**HONOR'S**

- Projects that are standard specific
- Enrichment activities
- Additional Critical Reading / literature readings related to the standard
- Virtual Labs
- MAP Distance Activity
- CHI Square Analysis
- **POGIL:** *Process oriented guided inquiry learning*
- **CER:** Claim Evidence & Reasoning Data Analysis

## Essential Guiding Questions

- How are the characteristics of one generation passed to the next?  
What allows traits to be transmitted from parents to offspring?
- How does variation affect a population under selective pressure?

## Segment 5: Structure, Function and Growth (from cells to organisms)

<p><b>Segment 5</b></p> <p><b>Structure, Function and Growth from cells to organisms</b></p> <p><b>SEP 1-6</b> <b>CCC 1-6</b> <b>DCI 2</b></p>	<p><b>E.O. 10</b> <i>Hierarchical Organization of Interacting Systems &amp; Homeostasis</i></p> <p><b>HS LS 1-1 Through HS LS 1-7</b></p> <p>Students will explain how the various parts of the body work together to maintain homeostasis.</p> <p>Students will describe the four common characteristics shared by Living things</p>	<p>Students can <b>describe</b> and <b>explain</b>:</p> <ul style="list-style-type: none"> <li>• The Characteristics of living things &amp; Biodiversity</li> <li>• How systems of cells, tissues, and organs function together to support the life processes in body systems.</li> </ul> <p>Through CER summary paragraphs, lab analysis, &amp; process activities.</p>	<p><b>Common Content Key Terms or Vocabulary for each standard:</b></p> <ul style="list-style-type: none"> <li>• Species</li> <li>• Energy</li> <li>• Living thing Stimulus</li> <li>• Systems</li> <li>• Homeostasis</li> <li>• Positive Feedback Loops</li> <li>• Negative Feedback</li> </ul> <p><b>Academic Vocabulary</b></p> <ul style="list-style-type: none"> <li>• Describe</li> <li>• Compare</li> <li>• Contrast</li> <li>• Differentiate</li> <li>• Explain</li> <li>• Hierarchy</li> </ul> <p><b>Focused Note taking Paragraph Summaries</b></p> <ul style="list-style-type: none"> <li>• CER Organizer</li> <li>• CER Summary</li> </ul> <p><b>Differentiated Critical Reading Strategies</b></p>	<p><b>Informal &amp; Formal Assessments</b></p> <ul style="list-style-type: none"> <li>• Student Portfolios &amp; or Interactive Notebooks</li> <li>• CER(Claim, Evidence, Reasoning)/ Summary Paragraphs</li> <li>• Differentiated Critical Reading</li> <li>• Inquiry Labs</li> <li>• Lab Reports</li> <li>• Common Formative Assessments</li> <li>• Common District Summative Assessments</li> </ul>	<p><b>Semester 2 Quarter 4</b></p>	<p><b>Extension Activities / HONOR'S</b></p> <ul style="list-style-type: none"> <li>• Projects that are standard specific</li> <li>• Enrichment activities</li> <li>• Additional Critical Reading / literature readings related to the standard</li> <li>• Virtual Labs</li> <li>• Models</li> <li>• <b>POGIL:</b> <i>Process oriented guided inquiry learning</i></li> <li>• <b>CER:</b> Claim Evidence &amp; Reasoning Data Analysis</li> </ul>
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## Essential Guiding Questions

- What happens if a cell in our body dies?
- How does the structure of DNA affect how cells look and behave?
- How do systems work in a multi-celled organism (emergent properties) and what happens if there is a change in the system?

□ How do organisms survive even when there are changes in their environment?

**Segment 5**

**Structure, Function and Growth from cells to organisms**

**SEP 1-6**  
**CCC 1-6**  
**DCI 2**

**E.O. 11**  
**Cell Biology**

HS LS 1-1  
Through HS LS 1-7

Identify and describe the structure and function of organelles in plant and animals systems.

Students are able to **investigate explanations** for the structure and function of cells as the basic units of life, the hierarchical systems of organisms, and the role of specialized cells for maintenance and growth.

Through CER summary paragraphs, lab analysis, evaluations, & process activities.

**Common Content Key Terms or Vocabulary for each standard**

- Structure
- Function
- Prokaryotic
- Eukaryotic
- Nucleus
- Mitochondria
- Chloroplast
- Cell membrane
- Active transport
- Passive transport
- Diffusion
- Osmosis

**Academic Language**

- Describe
- Explain
- Differentiate
- Compare/Contrast
- Investigate

**Focused Note taking Paragraph Summaries**

- CER Organizer
- CER Summary

**Differentiated Critical Reading Strategies**

**Microscope Technique**

**Informal & Formal Assessments**

- Student Portfolios & or Interactive Notebooks
- CER(Claim, Evidence, Reasoning)/ Summary Paragraphs
- Differentiated Critical Reading
- Inquiry Labs
- Lab Reports
- Common Formative Assessments
- Common District Summative Assessments

**Semester 2 Quarter 4**

**Extension Activities / HONOR'S**

- Projects that are standard specific
- Enrichment activities
- Additional Critical Reading / literature readings related to the standard
- Virtual Labs
- Models
- **POGIL:** *Process oriented guided inquiry learning*
- **CER:** Claim Evidence & Reasoning Data Analysis

**Essential Guiding Questions**

- What happens if a cell in our body dies?
- How does the structure of DNA affect how cells look and behave?
- How do systems work in a multi-celled organism (emergent properties) and what happens if there is a change in the system?
- How do organisms survive even when there are changes in their environment?

<p><b>Segment 5</b></p> <p><b>Structure, Function and Growth from cells to organisms</b></p> <p>SEP 1-6 CCC 1-6 DCI 2</p>	<p><b>E.O. 12</b></p> <p><b>Molecular Biology</b></p> <p>HS-LS1-4, HS LS3-1, LS 1.A, LS 1.B, LS 3.A &amp; LS 3.B</p> <p>Model the process of cell division in maintaining and reproducing organisms, including the process of protein synthesis.</p>	<p>Students can <b>construct</b> a <b>model</b> to <b>illustrate</b> the <b>life cycle of a cell</b>, including explanations based on evidence of how the <b>structure of DNA</b> determines the <b>structure of proteins</b> which carry out essential functions of life, and including role of <b>cellular division (mitosis)</b> and differentiation in producing and maintaining complex organisms.</p> <p><b>Through CER summary paragraphs, lab analysis, evaluations, &amp; process activities.</b></p>	<p><b>Common Content Key Terms or Vocabulary for each standard</b></p> <ul style="list-style-type: none"> <li>• Nucleotides</li> <li>• DNA</li> <li>• RNA</li> <li>• Cell Cycle</li> <li>• DNA Synthesis / Replication</li> <li>• Mitosis</li> <li>• Protein synthesis</li> <li>• Transcription</li> <li>• Translation</li> <li>• Mutation</li> <li>• Decomposition</li> <li>• Differentiation</li> <li>• Crossing Over</li> </ul> <p><b>Academic Language</b></p> <ul style="list-style-type: none"> <li>• Describe</li> <li>• Explain</li> <li>• Differentiate</li> <li>• Compare/Contrast</li> <li>• Construct</li> <li>• Determine</li> <li>• Illustrate</li> <li>• Model</li> </ul> <p><b>Focused Note taking Paragraph Summaries</b></p> <ul style="list-style-type: none"> <li>• CER Organizer</li> <li>• CER Summary</li> </ul> <p><b>Differentiated Critical Reading Strategies</b></p>	<p><b>Informal &amp; Formal Assessments</b></p> <ul style="list-style-type: none"> <li>• Student Portfolios &amp; or Interactive Notebooks</li> <li>• CER(Claim, Evidence, Reasoning)/ Summary Paragraphs</li> <li>• Differentiated Critical Reading</li> <li>• Inquiry Labs</li> <li>• Lab Reports</li> <li>• Common Formative Assessments</li> <li>• Common District Summative Assessments</li> </ul>	<p><b>Semester 2 Quarter 4</b></p>	<p><b>Extension Activities / HONOR'S</b></p> <ul style="list-style-type: none"> <li>• Projects that are standard specific</li> <li>• Enrichment activities</li> <li>• Additional Critical Reading / literature readings related to the standard</li> <li>• Virtual Labs</li> <li>• Biotechnology Inquiry Labs</li> <li>• <b>POGIL:</b> <i>Process oriented guided inquiry learning</i></li> <li>• <b>CER:</b> Claim Evidence &amp; Reasoning Lab Data Analysis</li> </ul>
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<p><b>Essential Guiding Questions</b></p> <ul style="list-style-type: none"> <li>□ What happens if a cell in our body dies?</li> <li>□ How does the structure of DNA affect how cells look and behave?</li> <li>□ How do systems work in a multi-celled organism (emergent properties) and what happens if there is a change in the system?</li> <li>□ How do organisms survive even when there are changes in their environment?</li> </ul>
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<p><b>Segment 5</b></p> <p><b>Structure, Function and Growth from cells to organisms</b></p> <p>SEP 1-6 CCC 1-6 DCI 2</p>	<p><b>E.O. 13</b></p> <p><b>OPTION: Stem Cell Debate</b></p> <p>ETS 1-3</p> <p><b>Time Permitting- HONORS Expectation</b></p> <p>Inquire about and address the pros and cons of a controversial topic</p>	<p>Students can <b>engage</b> in argument from Evidence using <b>Philosophical Chairs and CER.</b></p>	<p><b>Common Content Key Terms or Vocabulary for each standard</b></p> <ul style="list-style-type: none"> <li>Controversial</li> <li>Debate</li> </ul> <p><b>Academic Language</b></p> <ul style="list-style-type: none"> <li>Describe</li> <li>Explain</li> <li>Differentiate</li> <li>Compare/Contrast</li> <li>Engage</li> <li>Inquire</li> <li>Address</li> </ul> <p><b>Focused Note taking Paragraph Summaries</b></p> <ul style="list-style-type: none"> <li>CER Organizer</li> <li>CER Summary</li> </ul> <p><b>Differentiated Critical Reading Strategies</b></p>	<p><b>Informal &amp; Formal Assessments</b></p> <ul style="list-style-type: none"> <li>Student Portfolios &amp; or Interactive Notebooks</li> <li>CER(Claim, Evidence, Reasoning)/ Summary Paragraphs</li> <li>Differentiated Critical Reading</li> <li>Inquiry Labs</li> <li>Lab Reports</li> <li>Common Formative Assessments</li> <li>Common District Summative Assessments</li> </ul>	<p><b>Semester 2 Quarter 4</b></p>	<p><b>Extension Activities / HONOR'S</b></p> <ul style="list-style-type: none"> <li>Projects that are standard specific</li> <li>Enrichment activities</li> <li>Additional Critical Reading / literature readings related to the standard</li> <li>Virtual Labs</li> <li>Socratic Seminars</li> <li>AVID Graphic Organizers: <b>NEWS, DDDE, Read &amp; Recall</b></li> <li><b>POGIL:</b> <i>Process oriented guided inquiry learning</i></li> <li><b>CER:</b> Data Analysis</li> </ul>
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**Essential Guiding Questions**

- What happens if a cell in our body dies?
- How does the structure of DNA affect how cells look and behave?
- How do systems work in a multi-celled organism (emergent properties) and what happens if there is a change in the system?
- How do organisms survive even when there are changes in their environment?

<p><b>Segment 5</b></p> <p><b>Structure, Function and Growth from cells to organisms</b></p> <p>SEP 1-6 CCC 1-6 DCI 1,2, 3</p>	<p><b>E.O. 14</b> <i>Microbiology &amp; Biotechnology</i> <b>HONOR'S</b></p> <p>HS-LS1-1</p> <p>The genetic composition of cells can be altered by incorporation of exogenous DNA into the cells.</p>	<p>Students can <b>Investigate</b> transformation of bacteria techniques, <b>calculate</b> transformation efficiency, <b>model</b> recombinant DNA and <b>perform</b> DNA Fingerprinting Analysis using Gel Electrophoresis Gels.</p> <p><b>Through CER summary paragraphs, lab analysis, evaluations, &amp; process activities.</b></p>	<p><b>Common Content Key Terms or Vocabulary for each standard</b></p> <ul style="list-style-type: none"> <li>• Pathogens</li> <li>• Bacteria</li> <li>• Colonies</li> <li>• DNA</li> <li>• Fingerprinting</li> </ul> <p><b>Academic Language</b></p> <ul style="list-style-type: none"> <li>• Describe</li> <li>• Explain</li> <li>• Differentiate</li> <li>• Compare/Contrast</li> <li>• Model</li> <li>• Perform</li> <li>• Investigate</li> <li>• Analyze</li> </ul> <p><b>Focused Note taking Paragraph Summaries</b></p> <ul style="list-style-type: none"> <li>• CER Organizer</li> <li>• CER Summary</li> </ul> <p><b>Differentiated Critical Reading Strategies</b></p>	<p><b>Informal &amp; Formal Assessments</b></p> <ul style="list-style-type: none"> <li>• Student Portfolios &amp; or Interactive Notebooks</li> <li>• CER(Claim, Evidence, Reasoning)/ Summary Paragraphs</li> <li>• Differentiated Critical Reading</li> <li>• Inquiry Labs</li> <li>• Lab Reports</li> <li>• Common Formative Assessments</li> <li>• Common District Summative Assessments</li> </ul>	<p><b>Semester 2 Quarter 4</b></p>	<p><b>Extension Activities / HONOR'S</b></p> <ul style="list-style-type: none"> <li>• Projects that are standard specific</li> <li>• Enrichment activities</li> <li>• Additional Critical Reading / literature readings related to the standard</li> <li>• Virtual Labs</li> <li>• Biotechnology Inquiry Labs</li> <li>• More Gel Electrophoresis Activities</li> <li>• DNA Fragment Maps</li> <li>• <b>POGIL:</b> <i>Process oriented guided inquiry learning</i></li> <li>• <b>CER:</b> Claim Evidence &amp; Reasoning Data Analysis</li> </ul>
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<p><b>Essential Guiding Questions</b></p> <ul style="list-style-type: none"> <li>□ What happens if a cell in our body dies?</li> <li>□ How does the structure of DNA affect how cells look and behave?</li> <li>□ How do systems work in a multi-celled organism (emergent properties) and what happens if there is a change in the system?</li> <li>□ How do organisms survive even when there are changes in their environment?</li> </ul>
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# Segment 6: Ecosystem Stability and the Response to Climate Change

## Segment 6

**Ecosystem Stability & the Response to Climate Change**

SEP 1-6  
CCC 1-5, 7  
DCI 1,2

**E.O. 6**  
*Changes in the Environment and Human Impact on the Environment*

HS LS 2-1  
 Through HS LS 2-8 & HS LS-4-6  
 LS 2.A through LS 2-D & LS 4.D

Explain interactions and the movement of energy between organisms and the environment.

Students can **Investigate** the role of **animal & human behavior** on survival of individuals and species and the environment. Students can **model interactions** among organisms and how those interactions influence the **dynamics of ecosystems** and the environment. Students can **evaluate** and **adapt** existing **renewable and nonrenewable resources as they relate to ecological sustainability**.  
 Through CER summary paragraphs, lab analysis & evaluations, & a research project presentation.

**Common Key Terms or Vocabulary for each standard**

- Resources
- Climate change
- Nitrogen
- Atmosphere
- Hydrosphere
- Geosphere
- Human impacts

**Academic Language**

- Describe
- Explain
- Differentiate
- Compare/
- Contrast
- Demonstrate
- Investigate
- Mitigate

**Focused Note taking Paragraph Summaries**

- CER Organizer
- CER Summary

**Differentiated Critical Reading Strategies**

**Informal & Formal Assessments**

- Student Portfolios & or Interactive Notebooks
- CER(Claim, Evidence, Reasoning)/ Summary Paragraphs
- Differentiated Critical Reading
- Inquiry Labs
- Lab Reports
- Common Formative Assessments
- Common District Summative Assessments

**Semester 1 Quarter 2**

**Extension Activities / HONOR'S**

- Projects that are standard specific
- Enrichment activities
- Additional Critical Reading / literature readings related to the standard
- Virtual Labs
- Models
- **POGIL:** *Process oriented guided inquiry learning*
- **CER:** Claim Evidence & Reasoning Data Analysis

## Essential Guiding Questions

- What affects changes in ecosystems that ultimately affect populations?
- What are the changes that are happening in the climate and what effects are those having on life?
- How are human activities impacting Earth's systems and how does that affect life on Earth?
- What can humans do to mitigate their negative impact on the environment?

# ELA Connection

<p><b>ELA Connection</b></p>	<p>RST .11-12.1 WHST .9-12.2 (HS-LS1-1) <b>Cite specific textual evidence</b> to support analysis of science and technical texts and annotating distinctions that the author makes and to any gaps or inconsistencies in data.</p>	<p><b>Students can Write</b> informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <p><b>Through CER/Summary Paragraphs and Philosophical Chairs</b></p>	<p><b>Academic Language</b></p> <ul style="list-style-type: none"> <li>• Describe</li> <li>• Explain</li> <li>• Differentiate</li> <li>• Compare/Contrast</li> <li>• Marking text</li> <li>• Charting text</li> <li>• Interacting with text</li> <li>• Annotating text</li> </ul> <p><b>Focused Note taking Paragraph Summaries</b></p> <ul style="list-style-type: none"> <li>• CER Organizer</li> <li>• CER Summary</li> </ul> <p><b>Differentiated Critical Reading Strategies</b></p>	<p><b>Informal &amp; Formal Assessments</b></p> <ul style="list-style-type: none"> <li>• Student Portfolios &amp; or Interactive Notebooks</li> <li>• CER/Summary Paragraphs</li> <li>• Differentiated Critical Reading</li> <li>• Inquiry Labs</li> <li>• Lab Reports</li> <li>• Common Formative Assessments</li> </ul>	<p><b>Quarters 1-4</b></p>	<p><b>Extension Activities / HONOR'S</b></p> <ul style="list-style-type: none"> <li>• Projects that are standard specific</li> <li>• Enrichment activities</li> <li>• Additional literature readings related to the standard</li> <li>• Online / Digital Critical Readings-- Marking and Charting Text and Rhetorical Precis.</li> </ul>
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