

**California Education and the Environment Initiative**

*The EEI Curriculum cohesively integrates science and engineering practices (SEPs), content (disciplinary core ideas/DCIs), and crosscutting concepts (CCs) within its lesson procedures. This preliminary analysis intentionally teases apart the individual SEPs, DCIs, and CCs as a means of correlating the EEI unit with specific performance expectations; however, the EEI lessons weave these components back together to provide three-dimensional learning for students.*



**Middle School (Grades 7 and 8 in the Integrated Course Model)**

**7.3.e. - Responding to Environmental Change**

In “Responding to Environmental Change” students examine a variety of empirical evidence about how the availability of resources affects the organisms in several ecosystems. They look at population growth in California as the basis for examining how human consumption of natural resources influences the populations of organisms. They also use information about human activity to predict environmental change and discuss its effects on the extinction of organisms.



**Next Generation Science Standards\* Correlation with the California Education and the Environment Initiative (EEI) Curriculum**

The EEI Curriculum is a great choice for transitioning to NGSS and contributes toward achievement of the performance expectations for the disciplinary core ideas reflected in the Summary Chart below: MS-LS2-Ecosystems: Interactions, Energy, Dynamics; and MS-ESS3 Earth and Human Activity. Each EEI unit highlights a small number of performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts. Therefore, the EEI units contribute to students’ overall achievement of the performance expectations by the end of a school year, where they will have had multiple opportunities to engage in all appropriate science and engineering practices, disciplinary core ideas, and crosscutting concepts. While EEI was designed to teach the 1998 California science standards to mastery, it reflects the real world interconnections in science and already incorporates many of the paradigm shifts reflected in the NGSS. To learn more about how EEI supports NGSS, visit <http://californiaeei.org/NGSSGuides/>.



**Correlation Chart Key**

SEP (Science and Engineering Practices)
DCI (Disciplinary Core Ideas)
CC (Crosscutting Concepts)

	Next Generation Science Standards					
	MS-LS2			MS-ESS3		
<b>California Connection</b>		✓	✓		✓	✓
<b>Lesson 1</b> - Examine how the adaptive characteristics of the coyote respond to environmental changes.		✓	✓		✓	✓
<b>Lesson 2</b> - Study extinct species and discuss the causes of their extinction.	✓	✓	✓	✓	✓	✓
<b>Lesson 3</b> -Compare population growth and extinction over time by looking at the effects of land use changes.	✓		✓	✓	✓	✓
<b>Lesson 4</b> -Analyze how the consumption of resources affects extinction rates.	✓	✓	✓	✓	✓	✓
<b>Lesson 5</b> -Examine California’s threatened ecosystems and how human activities influence these systems.	✓	✓	✓	✓	✓	✓
<b>Lesson 6</b> -Map the location of several of California species and study the level of human activity in the region.		✓	✓		✓	✓
<b>Traditional Unit Assessment</b>	✓	✓	✓	✓	✓	✓
<b>Alternative Unit Assessment</b>	✓	✓	✓	✓	✓	✓
	SEP	DCI	CC	SEP	DCI	CC

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**EEI Unit 7.3.e. - Responding to Environmental Change**

Disciplinary Core Ideas Supported by this EEI Unit MS-LS2-Ecosystems: Interactions, Energy, Dynamics MS-ESS3 Earth and Human Activity					
Performance Expectations			Suggestions for Using the EEI Unit to Support NGSS		
<b>MS-LS2-1</b> ( <i>Grade 7 in the Integrated Course Model</i> ): Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.			Use the unit to give students multiple opportunities to discuss and analyze how the availability of resources (such as habitat and food) affects the populations of plants and animals, causing some species to become endangered or extinct, and causing some species to have an increase in population if they can adapt to available resources.		
<b>MS-LS2-4</b> ( <i>Grade 7 in the Integrated Course Model</i> ): Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.			Use the unit to have students examine evidence about how changes in habitat, food availability, and changes in global climate can affect populations of organisms.		
<b>MS-ESS3-4</b> ( <i>Grade 8 in the Integrated Course Model</i> ): Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems			Use this unit to have students evaluate evidence of the connections between human activities and the endangerment or extinction of species. Have them use what they learn to develop ideas about how humans can help mitigate negative impacts to help species survive.		
Science and Engineering Practices (SEPs)	Suggestions for Using EEI to Support SEPs	Disciplinary Core Ideas (DCIs)	Suggestions for Using EEI to Support DCIs	Crosscutting Concepts (CCs)	Suggestions for Using EEI to Support CCs
<b>Analyzing and interpreting data (MS-LS2-1)</b>  <b>Engaging in argument from evidence (MS-LS2-4, MS-ESS3-4)</b>	<p>Have students analyze data (charts, graphs, and maps) to acquire, predict, and share knowledge about population changes, human impacts on ecosystems, and potential ways to help certain habitats and species (Lessons 2, 3, and 5).</p> <p>Use this unit to have students construct written arguments that support how humans have altered ecosystems for thousands of years, and the correlation between the increase of species extinction and the increase of human population (Lessons 2 and 3). Give students the opportunity to construct written arguments that show the way in which humans consume and conserve resources, and the effects these activities have on species within an ecosystem (Lessons 4 and 5).</p>	<p><b>LS2.A: Interdependent Relationships in Ecosystems:</b></p> <ul style="list-style-type: none"> <li>- Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.</li> <li>- Growth of organisms and population increases are limited by access to resources. (MS-LS2-1)</li> </ul>	Allow students to work independently and in groups to learn that organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors (Lessons 1 and 2). Engage students using multiple scenarios through which they discover that the growth of organisms and population increases are limited by access to resources (Lessons 4 and 5).	<p><b>Cause and Effect (MS-LS2-1, MS-ESS3-4)</b></p>	Have students identify actual and possible causes of extinctions through the study of three extinct species (Lesson 2). Give students the opportunity to analyze data and graphs to discover that the growth in human population over time is linked to the extinction rates of birds and mammals (Lesson 3). Ask students to evaluate five species of animals to determine how adaptability within a species may help it to survive over time (Lesson 6).

Science and Engineering Practices (SEPs)	Suggestions for Using EEI to Support SEPs	Disciplinary Core Ideas (DCIs)	Suggestions for Using EEI to Support DCIs	Crosscutting Concepts (CCs)	Suggestions for Using EEI to Support CCs
<p><b>Constructing explanations and designing solutions</b> <b>(Not associated with a specific Performance Expectation)</b></p>	<p>Have students study how humans alter ecosystems through the acquisition and use of natural resources, and have them analyze and share possible solutions to help three specific California ecosystems (Lessons 4 and 5).</p>	<p><b>LS2.C: Ecosystem Dynamics, Functioning, and Resilience:</b> Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)</p> <p><b>ESS3.C: Human Impacts on Earth Systems:</b> Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3-4)</p>	<p>Give students the opportunity to learn, through the study of four organisms, that ecosystems are dynamic in nature, and that changes to any physical or biological component of an ecosystem can lead to shifts in all its populations (Lessons 1 and 2). Have students analyze three separate ecosystems in California, and learn that the completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health (Lesson 6).</p> <p>Use the unit to teach students how human activity can have different effects (negative and positive) on different living things (Lessons 1 and 2). Have students study how human activities have caused the extinction of some species (Lessons 2) and/or have sometimes damaged or destroyed natural habitats (Lessons 4 and 5). Have students study multiple ways that humans use natural resources (e.g. burning coal and oil) and that some of these activities release greenhouse gases and are major factors in the current rise in Earth’s mean surface temperature (Lesson 4).</p>	<p><b>Stability and Change (MS-LS2-4)</b></p>	<p>Give students multiple opportunities to evaluate how an ecosystems stability may be disturbed through both human and natural causes (Lessons 1, 2). Teach students, using multiple examples, how human activities affect the stability of organisms within an ecosystem (Lessons 4 and 5). Give students the opportunity to learn that species able to adapt to environmental changes are more likely to survive those changes (Lesson 6).</p>