

# Opportunities for Climate Change Instruction

## Amplify Science

Last year, California approved Assembly Bill 285 (statutes of 2023) ([Bill Text - AB-285 Pupil instruction: science requirements: climate change. \(ca.gov\)](#)), which requires grades 1-12 classroom instruction by the 2024-25 school year on the subject of climate change. We are pleased to share that in 2018, our Amplify Science curriculum for grades K-8 was approved as part of the state-adopted materials, having been found to align with the NGSS and the 2016 California Science Framework. The chart below shows opportunities for climate and climate change instruction in the California NGSS, the 2016 California Science Framework, and Amplify Science for grades K-8.

## Kindergarten

California Science Framework	NGSS Performance Expectations	Amplify Science Lessons
<p><a href="#">Chapter 3</a> p. 120–130 Vignette 3.1: Made for the Shade (p. 123)</p> <p>p. 188–200 Vignette 3.4: Caring About and Protecting the Environment (p. 188)</p>	<p><b>K-ESS2-1</b> Use and share observations of local weather conditions to describe patterns over time.</p>	<p><b><i>Sunlight and Weather</i></b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.3</a></li> <li>• <a href="#">Lesson 1.4</a></li> <li>• <a href="#">Lesson 3.2</a></li> <li>• <a href="#">Lesson 5.1</a></li> </ul>
	<p><b>K-ESS3-2</b> Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.</p>	<p><b><i>Sunlight and Weather</i></b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 5.1</a></li> <li>• <a href="#">Lesson 5.2</a></li> <li>• <a href="#">Lesson 5.3</a></li> </ul>
	<p><b>K-ESS3-3</b> Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.</p>	<p><b><i>Needs of Plants and Animals</i></b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 4.2</a></li> <li>• <a href="#">Lesson 4.3</a></li> <li>• <a href="#">Lesson 4.4</a></li> </ul>
	<p><b>K-PS3-1</b> Make observations to determine the effect of sunlight on Earth’s surface.</p>	<p><b><i>Sunlight and Weather</i></b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 2.2</a></li> <li>• <a href="#">Lesson 3.1</a></li> <li>• <a href="#">Lesson 4.1</a></li> </ul>
	<p><b>K-PS3-2</b> Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.</p>	<p><b><i>Sunlight and Weather</i></b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 2.2</a></li> <li>• <a href="#">Lesson 2.4</a></li> <li>• <a href="#">Lesson 4.4</a></li> </ul>

## Grade 1

California Science Framework	NGSS Performance Expectations	Amplify Science Lessons
<a href="#">Chapter 3</a> p. 140–144  p. 154–161 Vignette 3.2: Patterns of Motion of the Sun (p. 156)  p. 188–200 Vignette 3.4: Caring About and Protecting the Environment (p. 188)	<b>1-LS1-1</b> Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.	<b><i>Animal and Plant Defenses</i></b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.3</a></li> <li>• <a href="#">Lesson 1.5</a></li> <li>• <a href="#">Lesson 2.8</a></li> </ul>
	<b>1-ESS1-2</b> Make observations at different times of year to relate the amount of daylight to the time of year.	<b><i>Spinning Earth</i></b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 4.2</a></li> <li>• <a href="#">Lesson 5.1</a></li> <li>• <a href="#">Lesson 5.2</a></li> </ul>

## Grade 2

California Science Framework	NGSS Performance Expectations	Amplify Science Lessons
<a href="#">Chapter 3</a> p. 173–186 Vignette 3.3: Biodiversity in Changing Environments (p. 180)  p. 188–200 Vignette 3.4: Caring About and Protecting the Environment (p. 188)	<b>2-ESS1-1</b> Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	<b><i>Changing Landforms</i></b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.4</a></li> <li>• <a href="#">Lesson 3.5</a></li> <li>• <a href="#">Lesson 4.1</a></li> </ul>
	<b>2-ESS2-1</b> Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	<b><i>Changing Landforms</i></b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.3</a></li> <li>• <a href="#">Lesson 2.3</a></li> <li>• <a href="#">Lesson 3.4</a></li> </ul>

Grade 3

California Science Framework	NGSS Performance Expectations	Amplify Science Lessons
<p><a href="#">Chapter 4</a> p. 228–237 Snapshot 4.4: Living Things in Changing Environments (p. 235)</p> <p>p. 238–251 Vignette 4.1 How Does Weather Impact My Community? (p. 241)</p>	<p><b>3-LS4-4</b> Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.</p>	<p><b><i>Environments and Survival</i></b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.1</a></li> <li>• <a href="#">Lesson 3.3</a></li> <li>• <a href="#">Lesson 3.4</a></li> </ul>
	<p><b>3-ESS2-1</b> Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.</p>	<p><b><i>Weather and Climate</i></b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.2</a></li> <li>• <a href="#">Lesson 3.3</a></li> <li>• <a href="#">Lesson 4.2</a></li> </ul>
	<p><b>3-ESS2-2</b> Obtain and combine information to describe climates in different regions of the world.</p>	<p><b><i>Weather and Climate</i></b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.2</a></li> <li>• <a href="#">Lesson 3.3</a></li> <li>• <a href="#">Lesson 3.5</a></li> </ul>
	<p><b>3-ESS3-1</b> Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.</p>	<p><b><i>Weather and Climate</i></b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 4.2</a></li> <li>• <a href="#">Lesson 4.3</a></li> <li>• <a href="#">Lesson 4.4</a></li> </ul>

## Grade 4

California Science Framework	NGSS Performance Expectations	Amplify Science Lessons
<a href="#">Chapter 4</a> p. 258–262  p. 263–273	<b>4-ESS2-1</b> Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	<b>Earth's Features</b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 2.2</a></li> <li>• <a href="#">Lesson 4.1</a></li> <li>• <a href="#">Lesson 4.4</a></li> </ul>
	<b>4-ESS3-1</b> Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	<b>Energy Conversions</b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.1</a></li> <li>• <a href="#">Lesson 3.3</a></li> <li>• <a href="#">Lesson 4.5</a></li> </ul>
	<b>4-ESS3-2</b> Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.	<b>Waves, Energy, and Information</b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.3</a></li> </ul> <b>Earth's Features</b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 4.3</a></li> </ul> <b>Energy Conversions</b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.3</a></li> <li>• <a href="#">Lesson 3.4</a></li> </ul>
	<b>4-PS3-4</b> Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	<b>Energy Conversions</b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 2.1</a></li> <li>• <a href="#">Lesson 3.1</a></li> <li>• <a href="#">Lesson 4.2</a></li> </ul>

Grade 5

California Science Framework	NGSS Performance Expectations	Amplify Science Lessons
<a href="#">Chapter 4</a>  p. 320–326	<b>5-ESS2-1</b> Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	<b>The Earth System</b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.3</a></li> <li>• <a href="#">Lesson 3.3</a></li> <li>• <a href="#">Lesson 4.2</a></li> </ul>
	<b>5-ESS3-1</b> Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.	<b>The Earth System</b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.2</a></li> <li>• <a href="#">Lesson 1.3</a></li> </ul> <b>Ecosystem Restoration</b> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.8</a></li> <li>• <a href="#">Lesson 2.6</a></li> </ul>

## Grade 6

California Science Framework	NGSS Performance Expectations	Amplify Science Lessons
<p><a href="#">Chapter 5: Preferred Integrated Course Model</a></p> <p>p. 368–385 Vignette 5.1: Interactions of Earth Systems Cause Weather (p. 371)</p> <p>p. 395–405</p> <p>p. 411–421 Snapshot 5.4: Monitoring and Minimizing Human Environmental Impacts (p. 419)</p> <p><a href="#">Chapter 6: Discipline Specific Model</a></p> <p>p. 593–609</p> <p>p. 610–617</p>	<p><b>MS-ESS2-4</b> Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.</p>	<p><b>Weather Patterns</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.2</a></li> <li>• <a href="#">Lesson 2.1</a></li> <li>• <a href="#">Lesson 2.3</a></li> </ul>
	<p><b>MS-ESS2-5</b> Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.</p>	<p><b>Weather Patterns</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.2</a></li> <li>• <a href="#">Lesson 3.3</a></li> <li>• <a href="#">Lesson 4.3</a></li> </ul>
	<p><b>MS-ESS2-6</b> Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.</p>	<p><b>Ocean, Atmosphere, and Climate</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.4</a></li> <li>• <a href="#">Lesson 3.2</a></li> <li>• <a href="#">Lesson 3.3</a></li> </ul>
	<p><b>MS-ESS3-2</b> Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.</p>	<p><b>Plate Motion</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.3</a></li> <li>• <a href="#">Lesson 4.3</a></li> </ul> <p><b>Plate Motion Engineering Internship</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Day 9</a></li> </ul> <p><b>Ocean, Atmosphere, and Climate</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 2.3</a></li> </ul>
	<p><b>MS-ESS3-3</b> Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p>	<p><b>Earth's Changing Climate</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.2</a></li> <li>• <a href="#">Lesson 2.1</a></li> </ul>

		<ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.3</a></li> </ul>
	<p><b>MS-ESS3-5</b> Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.</p>	<p><b>Earth's Changing Climate</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.3</a></li> <li>• <a href="#">Lesson 4.3</a></li> </ul> <p><b>Ocean, Atmosphere, and Climate</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 2.1</a></li> <li>• <a href="#">Lesson 4.2</a></li> </ul>
	<p><b>MS-PS3-3</b> Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.</p>	<p><b>Phase Change Engineering Internship</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Day 4</a></li> <li>• <a href="#">Day 7</a></li> </ul> <p><b>Thermal Energy</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.3</a></li> <li>• <a href="#">Lesson 4.3</a></li> </ul>



## Grade 7

California Science Framework	NGSS Performance Expectations	Amplify Science Lessons
<p><a href="#">Chapter 5: Preferred Integrated Course Model</a></p> <p>p. 470–473 Snapshot 5.5: Planning a Large-Scale Investigation (p. 472)</p> <p><a href="#">Chapter 6: Discipline Specific Model</a></p>	<p><b>MS-ESS3-2</b> Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.</p>	<p><b>Plate Motion</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 1.3</a></li> <li>• <a href="#">Lesson 4.3</a></li> </ul> <p><b>Plate Motion Engineering Internship</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Day 9</a></li> </ul> <p><b>Ocean, Atmosphere, and Climate</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 2.3</a></li> </ul>
<p>p. 694–697</p>	<p><b>MS-LS2-4</b> Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.</p>	<p><b>Populations and Resources</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.4</a></li> <li>• <a href="#">Lesson 4.1</a></li> <li>• <a href="#">Lesson 4.3</a></li> </ul>

Grade 8

California Science Framework	NGSS Performance Expectations	Amplify Science Lessons
<p><a href="#">Chapter 5: Preferred Integrated Course Model</a></p> <p>p. 507–511 Snapshot 5.8: Making Sense of Natural Selection (p. 507)</p> <p>p. 519–535</p> <p>p. 540–543 Snapshot 5.10: School Solar Energy Project (p. 542)</p> <p>p. 546–556 Vignette 5.4: Student Capstone Projects (p. 546)</p> <p><a href="#">Chapter 6: Discipline Specific Model</a></p> <p>p. 726–729</p>	<p><b>MS-ESS3-4</b> Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems.</p>	<p><b>Earth’s Changing Climate</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.1</a></li> <li>• <a href="#">Lesson 4.3</a></li> </ul> <p><b>Ocean, Atmosphere, and Climate</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 2.4</a></li> </ul>
	<p><b>MS-PS3-3</b> Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.</p>	<p><b>Phase Change Engineering Internship</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Day 4</a></li> <li>• <a href="#">Day 7</a></li> </ul> <p><b>Thermal Energy</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lesson 3.3</a></li> <li>• <a href="#">Lesson 4.3</a></li> </ul>

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