

# Teacher's Guide

# muse®

FEBRUARY 2017

## MAGAZINE ARTICLES

|                                      |    |
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| Canary in the Coalmine . . . . .     | 10 |
| Expository Nonfiction 1130L          |    |
| New Maps in a Warmer World . . . . . | 20 |
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| Kids v. Government. . . . .          | 26 |
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# CLIMATE REALITY



From Cricket Media



## Teacher's Guide for *Muse: Climate Reality*

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## OVERVIEW

*In this magazine, readers will learn how scientists monitor the effects of global warming. **Muse: Climate Reality** includes information about*

*the causes of global warming and possible scenarios of what the future holds.*

## ESSENTIAL QUESTION:

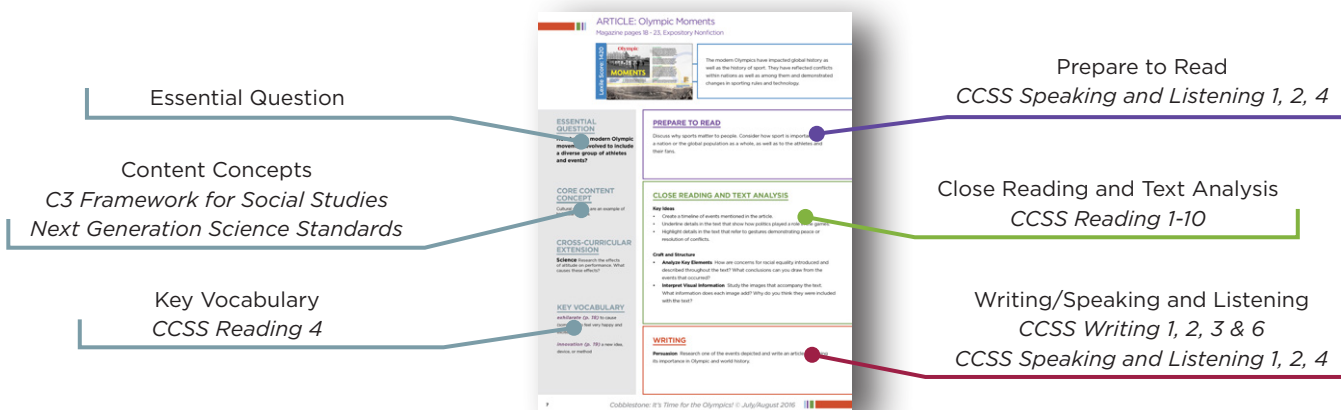
***What are the causes and consequences of climate change?***



We invite you to use this magazine as a flexible teaching tool, ideal for providing interdisciplinary instruction of social studies and science content as well as core literacy concepts. Find practical advice for teaching individual articles or use a mini-unit that helps your students make cross-text connections as they integrate ideas and information.

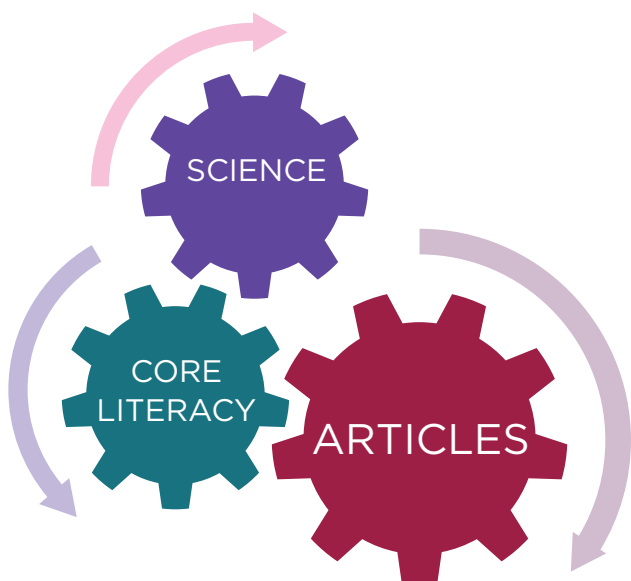
## READ INDIVIDUAL ARTICLES PAGES 4 - 8

Each article in this magazine is well-suited for teaching literacy concepts and content area knowledge. For each individual article in this guide, you'll find the following:



## TEACH A MINI-UNIT PAGES 10 - 12

Magazine articles can easily be grouped to make cross-text connections and comparisons. Our Mini-Unit allows students to read and discuss multiple articles and integrate ideas and information (CCSS.Reading.9). Discussing multiple articles (CCSS.Reading.9) prepares students to write texts to share and publish in a variety of ways (CCSS.Writing.2).



**Essential Question:** What are the causes and consequences of climate change?

| MAGAZINE ARTICLES  | CORE CONTENT CONCEPT  | LITERACY SKILLS  | CORRESPONDING CCSS ANCHOR STANDARDS                                 |
|--|---|--|---|
| <b>Canary in the Coalmine</b><br>Expository Nonfiction     | Phenomena that can be observed at one scale may not be observable at another scale.                                 | <ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Analyze Word Choice</li> <li>• Evaluate Evidence</li> <li>• Write Observations</li> </ul>            | <i>Reading 1, 2, 4 &amp; 8</i><br><i>Writing 2</i>                  |
| <b>New Maps in a Warmer World</b><br>Expository Nonfiction | Cause and effect relationships may be used to predict phenomena in natural or designed systems.                     | <ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Interpret Visual Information</li> <li>• Analyze Perspectives</li> <li>• Present a Report</li> </ul>  | <i>Reading 1, 3, 6 &amp; 7</i><br><i>Speaking &amp; Listening 4</i> |
| <b>Kids v. Government</b><br>Expository Nonfiction         | Individuals may shape significant historical change.  | <ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Analyze Text Features</li> <li>• Analyze Tone</li> <li>• Write a Bill</li> </ul>                     | <i>Reading 1, 2, 3, 4 &amp; 5</i><br><i>Writing 1</i>               |
| <b>Lobsters on the Edge</b><br>Expository Nonfiction       | Populations of organisms are dependent on environmental interactions with living things and with nonliving factors. | <ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Evaluate Evidence</li> <li>• Interpret Figurative Language</li> <li>• Write a Comic Strip</li> </ul> | <i>Reading 1, 3, 4 &amp; 8</i><br><i>Writing 3</i>                  |
| <b>Fasten Your Seatbelt</b><br>Expository Nonfiction       | Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.      | <ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Analyze Imagery</li> <li>• Analyze Tone</li> <li>• Present a Speech</li> </ul>                       | <i>Reading 1, 2 &amp; 4</i><br><i>Speaking &amp; Listening 4</i>    |

**Comparing Texts:** *Reading 9*

**Mini-Unit:** *Reading 1 & 3; Writing 2, 4 & 7*



# ARTICLE: Canary in the Coalmine

Magazine pages 10 - 15, Expository Nonfiction



Scientists use sound to gauge the health of an ecosystem. By distinguishing between sounds made by humans, animals, and weather, these scientists can pinpoint problems in an ecosystem and work toward conservation.

## ESSENTIAL QUESTION

**What are the causes and consequences of climate change?**

## CORE CONTENT CONCEPT

**Science** Phenomena that can be observed at one scale may not be observable at another scale.

## CROSS-CURRICULAR EXTENSION

**Science** Create a soundscape timeline of your household. Sit in the same spot at three different times during the day and note the sounds you hear. Do the sounds change over the course of the day? Create a timeline to describe your findings.

## KEY VOCABULARY

**soundscape (p. 11)** the acoustic environment that can be perceived by humans

**acoustic (p. 11)** of or relating to sound or the sense of hearing

**static (p. 14)** showing little or no change, action, or progress

## PREPARE TO READ

Instruct students to sit quietly for 60 seconds and listen closely to the sounds around them. After 60 seconds, ask students to name sounds they heard. Classify the sounds as human, animal, or weather-related. Discuss the sounds they might have heard 100 years ago and might hear 100 years in the future.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- Describe the three divisions of sounds and what they represent. Use details from the text to support your response. *CCSS Reading 1*
- Summarize what soundscape ecologists learn about an ecosystem by listening. Cite details from the text to support your response. *CCSS Reading 2*
- Describe the challenge Bernie Krause presents to readers and explain why it is difficult. Support your response with details from the article. *CCSS Reading 1*

### Craft and Structure

- Analyze Word Choice** The author chose a title that is never referred to in the article. Read the caption on page 11 and then explain why this title is a good choice for the article. *CCSS Reading 4*
- Evaluate Evidence** Locate examples of discoveries made by soundscape ecologists. Do they present sufficient evidence to convince you that this branch of science is legitimate? Explain your thoughts. *CCSS Reading 8*

## WRITING

**Write Observations** Analyze the sounds in your own neighborhood by sitting outside and listening carefully for 5-10 minutes. Note the different types of sounds you hear. Use this information to write a paragraph about your observations. Include a prediction about how the soundscape of your neighborhood might change in the future.

# ARTICLE: New Maps in a Warmer World

Magazine pages 20 - 25, Expository Nonfiction



Ocean temperatures are rising, causing ice to melt at a faster rate. As a result, low-lying areas and islands are disappearing into the ocean. In the future, land maps may look quite different from maps today.

## ESSENTIAL QUESTION

**What are the causes and consequences of climate change?**

## CORE CONTENT CONCEPT

**Science** Cause and effect relationships may be used to predict phenomena in natural or designed systems.

## CROSS-CURRICULAR EXTENSION

**Art** Draw an illustration, diagram, or comic strip to show how burning fossil fuels, such as coal and gasoline, leads to warmer seas. Use words and pictures to convey ideas. Share your finished work with the class.

## KEY VOCABULARY

**permafrost (p. 23)** a layer of soil that is always frozen in very cold regions of the world

**delta (p. 23)** a piece of land shaped like a triangle that is formed when a river splits into smaller rivers before it flows into an ocean

## PREPARE TO READ

Ask students to share what they know about the seasonal transition from winter to spring. Discuss the effects that melting winter snow often has on ponds, streams, streets and roads. Then ask students how a quick spring warm-up and a gradual warm-up might have different effects on these areas.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- How has burning fossil fuels made seas warmer? Cite details from the article in your response. *CCSS Reading 3*
- What does the future hold for coastlines around the world? Support your answer with details from the text. *CCSS Reading 1*
- How might the current climate situation create future career opportunities for young people? Use text details to support your ideas. *CCSS Reading 1*

### Craft and Structure

- **Interpret Visual Information** Look at the photos on pages 20 and 24-25. How do these images help your understanding of this issue? Do you think the images are as important as the information in the text? Explain. *CCSS Reading 7*
- **Analyze Perspectives** Find quotes by Orrin Pilkey and Harold Wanless to determine their different perspectives on rising sea levels. What tone, or attitude, does each scientist have about this topic? *CCSS Reading 6*

## SPEAKING AND LISTENING

**Present a Report** The Industrial Revolution changed the world in both negative and positive ways. Conduct online or library research to learn about the multiple effects the Industrial Revolution had on people and the planet. Create a report about what you learn and present it to the class.



Student activists have filed a lawsuit against the U.S. government. They claim the government is violating their rights by not doing enough to halt global warming.

## ESSENTIAL QUESTION

**What are the causes and consequences of climate change?**

## CORE CONTENT CONCEPT

**Social Studies** Individuals may shape significant historical change.

## CROSS-CURRICULAR EXTENSION

**Civics** Conduct research to find out how a bill becomes a law. Then create a flow chart to show this process.

## KEY VOCABULARY

**emissions (p. 27)** something sent out or given off

**activist (p. 27)** a person who uses or supports strong actions, such as public protests, to help make changes in politics or society

**fossil fuel (p. 28)** a fuel such as coal, oil, or natural gas that is formed in the earth from dead plants or animals

## PREPARE TO READ

Have students share what they know about lawsuits. Discuss different reasons students their age might want to bring a lawsuit against the U. S. government. Then ask students if they think children can successfully sue adults.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- How has global warming affected the lives of young people? Support your response with details from the text. *CCSS Reading 1*
- Summarize the students' case against the government. Cite details from the text in your summary. *CCSS Reading 2*
- Identify cause-effect relationships throughout the article. How did these relationships lead to the creation of this lawsuit? Cite details from the article in your response. *CCSS Reading 3*

### Craft and Structure

- **Analyze Text Features** Read the heading and the text in one section of the article. Use the heading to help you write the section's main idea. Then meet with other students to compare main ideas for this section. *CCSS Reading 5*
- **Analyze Tone** What is the author's tone, or attitude, about the students and their lawsuit? Identify the details that convey this tone. How do the photos help show the tone? *CCSS Reading 4*

## WRITING

**Draft a Bill** What school or local issue do you feel strongly about? Work with a partner to draft a bill that would change this situation. In the first part of your bill—the preamble—describe the situation or problem you are addressing and why it needs to be solved. In the body, or main part, of your bill, describe your plan of action for solving the problem. In the last part of your bill, explain when the bill will take effect. Share your bill with the class.

# ARTICLE: Lobsters on the Edge

Magazine pages 34-38, Expository Nonfiction



The lobster population off the New England coast is dwindling. This is a terrible situation for a region whose economy relies on lobsters. Scientist Richard Wahle has been studying the waters since 1990 to find the causes of, and the solutions to, this downturn.

## ESSENTIAL QUESTION

**What are the causes and consequences of climate change?**

## CORE CONTENT CONCEPT

**Science** Populations of organisms are dependent on environmental interactions with living things and with nonliving factors.

## CROSS-CURRICULAR EXTENSION

**Social Studies/Economics** What effects will the disappearance of lobsters have on the economy of New England coastal towns? Use the internet to learn how adults and children will be affected. Share what you learn with the class.

## KEY VOCABULARY

**revenue (p. 35)** money that is made by or paid to a business or an organization

**buoy (p. 36)** an object that floats on water in a lake, bay, river, etc., to show areas that are safe or dangerous for boats

**sieve (p. 37)** a tool that has many small holes and is used to separate smaller particles from larger ones or solids from liquids

## PREPARE TO READ

Help students brainstorm a list of major industries or employers in your state. Then have students hypothesize what would happen if some or all of these industries suddenly (or slowly) disappeared.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- Explain what's happening to the lobster industry and why. Support your response with details from the article. *CCSS Reading 1*
- What methods did Wahle use to survey lobsters? Why did he use different methods? Use details from the text in your responses. *CCSS Reading 1*
- Describe the relationship between New England and the lobster industry. Cite textual evidence to support your description. *CCSS Reading 3*

### Craft and Structure

- **Evaluate Evidence** Based on information in the article, do you feel the studies being conducted are thorough? Is the evidence sufficient to support Wahle's conclusions? Explain your thinking. *CCSS Reading 8*
- **Analyze Word Choice** The article's title uses the idiom "on the edge." Use information from the article to infer the meaning of this idiom. Who or what else will be on the edge if seas continue to warm? *CCSS Reading 4*

## WRITING

**Write a Comic Strip** Create a comic strip to raise awareness of the effects of climate change on lobsters. Draw lobsters as your main characters. Write lobster dialogue that will educate readers on the plight of this New England industry. Share your comic strip with classmates.





Nobody knows with certainty the extent to which climate change will affect the planet. However, being prepared for the worst may help us better handle catastrophe. Planning for the future and investing in new technology will create future opportunities for today's youth to help our planet.

## ESSENTIAL QUESTION

**What are the causes and consequences of climate change?**

## CORE CONTENT CONCEPT

**Science** Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.

## CROSS-CURRICULAR EXTENSION

**Math** Use details about the Jakobshavn Glacier to calculate the rate at which it is melting. Then make a prediction about the future of the glacier based on this information. Share your information with classmates.

## KEY VOCABULARY

**niche** (p. 42) the situation in which a business's products or services can succeed by being sold to a particular kind or group of people

**geothermal** (p. 43) of, relating to, or using the natural heat produced inside the Earth

## PREPARE TO READ

Instruct students to brainstorm a list of the types of emergency drills they've taken part in, such as earthquake, fire, hurricane, and tornado. Discuss the purpose and the benefits behind doing these drills. Ask students if they think the drills are necessary and why or why not.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- What is the author's main idea? Cite details from the text to support your response. *CCSS Reading 2*
- What point is the author making using the scenarios on pages 41-42? Support your response with details from the article. *CCSS Reading 1*
- Alley says this generation faces "a challenge and an opportunity." Use details from the article to explain what he means. *CCSS Reading 1*

### Craft and Structure

- **Analyze Imagery** The author uses cars and driving to create comparisons. Identify three examples and explain the point each comparison makes. Then make up new comparisons that make these same points. *CCSS Reading 4*
- **Analyze Tone** How would you describe the author's tone in this article? Is he optimistic or pessimistic? Is the tone the same throughout the article or does it change? Discuss ideas with a partner. *CCSS Reading 4*

## SPEAKING AND LISTENING

**Present a Speech** Assume you are running for public office. You are asked by news media to expand on your thoughts about global warming. Prepare a speech that describes what you believe to be the top priorities of this issue. Then practice presenting your speech using a strong tone of voice. When you're ready, present your speech to the class.

## CROSS-TEXT CONNECTIONS

**SYNTHESIZE:** Guide students to compare articles they read. Help students find the connections between pieces of information in multiple articles. Use prompts, such as the following examples, to have students work together to **Integrate Ideas and Information** (*CCSS.Reading.9*).

- Can climate change be stopped? Compare information from multiple articles to determine what can and cannot be done. Use a T-chart with the headings “Can Be Done” and “Can’t Be Done” to list information.
- How can young people make a difference when it comes to climate change? Consult “Kids v. Government” and at least one other article to find information. Then write a short essay to answer the question. In the conclusion of your essay, describe how you feel about the future of our planet. Is the future bright or dim?
- Gather information from across texts to help you visualize what our future planet might look like. Use this information to draw a scene that shows the future. Include a written description of your scene and why it looks the way it does.
- How does climate change affect the food chain? Scan the articles for information about the four components of the food chain: the sun, producers, consumers, and decomposers. Then write a paragraph to explain the effects.
- Using “Canary in the Coalmine” and two other articles, identify three examples of things that are observed and measured. Then create a science news show about climate change that incorporates these examples.

**EXPLORATORY LEARNING - FLEXIBLE MINI-UNIT DESIGN****ENGAGE****READ FOR A  
PURPOSE****APPLY**

In this mini-unit, students will read about issues associated with climate change. Working independently, they will use magazine articles to answer research questions about climate change. Working in groups, they will create and present posters based on this research.

**ENGAGE:** Engage students in the topic of climate change by first reviewing the Essential Question: What are the causes and consequences of climate change? Discuss with students some present and future effects of climate change mentioned in the magazine articles. Use a chart like the one below to record students' responses.

**CLIMATE CHANGE EFFECTS**

| Effects we experience today | Effects we may experience in the future |
|-----------------------------|---|
|                             |   |



**READ FOR A PURPOSE**

**INTRODUCE THE ACTIVITY: CLIMATE CHANGE INFO EXCHANGE** Explain to students that in this activity, they will work in groups to research and analyze different aspects of climate change. Then they will create posters to convey this information. Continue by explaining that each group will use information from the magazine articles to answer one of the following questions:

- What are the signs of climate change and how did scientists detect these signs?
- What are the long-term effects of climate change on humans, animals, and the planet?
- What are the possible solutions to problems caused by climate change?

Tell students that they will work independently to gather information to answer their assigned question. Then they will collaborate with group members to create and present informational posters based on their research. In addition, each group will create a definition of the term “climate change.”

Now, divide the class into three groups and assign one of the questions above to each group.

**RETURN TO THE TEXT:** Explain to students that before they can create informational posters, they must conduct research using the magazine articles. Distribute a copy of the Climate Change Research form (p. 13) to each student. Have students work independently to find information from the articles that answers their question. Tell students that they may not be able to find useful information in every article.







**APPLY:** Now that students have gathered information from the magazine articles, they are ready to get together with their groups to create posters and write definitions for the term “climate change.”

### Materials

- completed Climate Change Research forms
- poster board or large pieces of paper
- markers, colored pencils

### STEP 1: Build Background

Have group members assemble. Then explain that group members will work together to compare research, create a definition for the term “climate change,” and make posters. Have each group appoint a note-taker for the project.

### STEP 2: Compare Information

Have group members share information from their research forms and decide which facts and details to include in their posters. The note-taker should keep track of this information by highlighting the facts and details on the research forms.

### STEP 3: Write a Definition

Tell group members to work together to come up with a definition for “climate change.” Remind them to use what they have learned from the magazine articles to help them. Note-takers should use the back of a research form to record ideas and write final definitions.

### STEP 4: Create Posters

Explain to groups that their posters should include the following information:

- their research question
- information they found that answers the question
- their definition of “climate change”

Have groups work together to decide how they will convey information on their posters. Tell students to include both written and visual information.

### STEP 5: Present

Tell groups to elect a member, or members, to present posters to the class. After rehearsing, presenters should take turns sharing their posters with the class.

### STEP 6: Vote

Display all definitions of “climate change.” Have students choose the best definition. If students can’t decide, work with them to synthesize ideas from the different definitions and come up with a final definition.





## CLIMATE CHANGE RESEARCH

Research Question: \_\_\_\_\_

**Notes from “Canary in the Coalmine”**

**Notes from “New Maps in a Warmer World”**

**Notes from “Kids v. Government”**

**Notes from “Lobsters on the Edge”**

**Notes from “Fasten Your Seatbelt”**





## Meeting State and National Standards: Core Instructional Concepts

The articles in this magazine provide a wealth of opportunities for meeting state and national instructional standards. The following pages contain charts listing Core Instructional Concepts for each of three curricular areas: English Language Arts, Science, and Social Studies.

### USING THE STANDARDS CHARTS

#### ELA

Corresponding CCSS anchor standards have been listed next to each item on the Core Instructional Concepts chart. To customize the chart, add your own grade, state, or district standards in the last column. Match the concepts and standards from the chart to the activities on each page of the Teacher's Guide to complete your lesson plans.

#### SOCIAL STUDIES

Content Concepts in each Article Guide are based on Dimension 2 of the CS Framework for Social Studies: Applying Disciplinary Concepts and Tools. Use the last column in the accompanying chart to correlate these concepts to your state or district standards.

#### SCIENCE

Content Concepts in each Article Guide are drawn from the Three Dimensions of the Next Generation Science Standards. You will also find connections to these concepts within individual close-reading questions.

#### MATH

Content Opportunities for math activities are provided in the Cross-Curricular extensions on each Article Guide page.

## CORE INSTRUCTIONAL CONCEPTS: READING, LITERATURE, AND LANGUAGE ARTS

| SKILLS AND CONCEPTS | CCSS ANCHOR STANDARD | CORRESPONDING STANDARD |
|---------------------|----------------------|------------------------|
|---------------------|----------------------|------------------------|

### KEY IDEAS AND DETAILS

|   |           |  |
|---|-----------|--|
| <b>Read closely to determine what a text says explicitly.</b>                                     | Reading 1 |  |
| <b>Make logical inferences</b> to determine what the text communicates implicitly.                | Reading 1 |  |
| <b>Cite specific textual evidence to support conclusions</b> drawn from the text.                 | Reading 1 |  |
| <b>Determine central ideas or themes</b> of a text and analyze their development.                 | Reading 2 |  |
| <b>Summarize key supporting details and ideas.</b>  | Reading 2 |  |
| Analyze how <b>individuals, events, and ideas develop and interact</b> over the course of a text. | Reading 3 |  |

### CRAFT AND STRUCTURE

|  |           |  |
|--|-----------|--|
| <b>Interpret words and phrases</b> as they are used in a text.                                     | Reading 4 |  |
| <b>Determine technical, connotative, and figurative meanings.</b>                                  | Reading 4 |  |
| Analyze how specific <b>word choices</b> shape meaning or tone.                                    | Reading 4 |  |
| Analyze the <b>structure of texts</b> (sequence, cause/effect, compare/contrast, problem/solution) | Reading 5 |  |
| Recognize the <b>genre, key elements, and characteristics</b> of literary texts.                   | Reading 5 |  |
| Assess how <b>point of view or purpose</b> shapes the content and style of a text.                 | Reading 6 |  |
| Analyze how an <b>author's style and tone</b> affects meaning.                                     | Reading 6 |  |

### INTEGRATION OF KNOWLEDGE AND IDEAS

|   |           |  |
|---|-----------|--|
| <b>Integrate and evaluate content</b> presented in diverse media and formats. | Reading 7 |  |
| <b>Identify and evaluate the argument and claims</b> in a text.               | Reading 8 |  |
| <b>Analyze how two or more texts address similar themes or topics.</b>        | Reading 9 |  |

### WRITING

|  |            |  |
|--|------------|--|
| Write <b>arguments</b> to support claims, using valid reasoning and relevant and sufficient evidence.                  | Writing 1  |  |
| Write <b>informative/explanatory texts</b> to examine and convey complex ideas and information clearly and accurately. | Writing 2  |  |
| Write <b>narratives</b> to develop real or imagined experiences or events.   | Writing 3  |  |
| <b>Draw evidence</b> from literary or informational texts to support analysis, reflection, and research.               | Writing 9  |  |
| Conduct short as well as more sustained <b>research projects</b> .   | Writing 10 |  |





# CORE INSTRUCTIONAL CONCEPTS: SOCIAL STUDIES

## C3 INQUIRY ARC DIMENSION 2: APPLYING DISCIPLINARY CONCEPTS AND TOOLS

## STATE OR DISTRICT STANDARD

### CIVICS

|  |  |
|--|--|
| Analyze the <b>origins, functions, and structure of different governments</b> and the <b>origins and purposes of laws</b> and key constitutional provisions. |  |
| Summarize core <b>civic virtues and democratic principles</b> .  |  |
| Evaluate <b>policies</b> intended to address social issues.  |  |

### ECONOMICS

|   |  |
|---|--|
| Evaluate the <b>benefits and costs of individual economic choices</b> .   |  |
| Analyze <b>economic incentives</b> , including those that cause people and businesses to specialize and trade.  |  |
| Explain the <b>importance of resources</b> (i.e. labor, human capital, physical capital, natural resources) in <b>methods of economic production</b> .                                |  |
| <b>Explain</b> the <b>functions of money</b> in a market economy.   |  |
| <b>Explain</b> the importance of <b>competition</b> in a market economy.  |  |
| Apply economic concepts (i.e. interest rate, inflation, supply and demand) and theories of <b>how individual and government actions affect the production of goods and services</b> . |  |
| <b>Analyze economic patterns</b> , including activity and interactions between and within nations.  |  |

### GEOGRAPHY

|   |  |
|---|--|
| <b>Construct and use maps</b> and other graphic representations (i.e. images, photographs, etc.) of different places.   |  |
| <b>Explain cultural influences</b> on the way people live and modify and adapt to their environments.   |  |
| <b>Analyze places, including their physical, cultural and environmental characteristics</b> and how they change over time.                                    |  |
| Analyze <b>movement of people, goods, and ideas</b> .   |  |
| <b>Analyze regions, including how they relate to one another</b> and the world as a whole from a political, economic, historical, and geographic perspective. |  |

### HISTORY

|   |  |
|---|--|
| Interpret historical context to <b>understand relationships among historical events or developments</b> .                 |  |
| Evaluate historical events and developments to identify them as <b>examples of historical change and/or continuity</b> .  |  |
| <b>Analyze perspectives</b> , including factors that influence why and how individuals and groups develop different ones. |  |
| <b>Evaluate historical sources</b> , including their reliability, relevancy, utility, and limitations.                    |  |
| <b>Analyze causes and effects</b> , both intended and unintended, of historical developments.                             |  |



# CORE INSTRUCTIONAL CONCEPTS: SCIENCE

## DIMENSION 1: SCIENTIFIC AND ENGINEERING PRACTICES

Dimension 1 focuses on the practice of science, and how knowledge is continually adapted based on new findings. The eight practices of the K-12 Science and Engineering Curriculum are as follows:

- Asking questions (for science) and defining problems (for engineering)
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations (for science) and designing solutions (for engineering)
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

## DIMENSION 2: CROSSCUTTING CONCEPTS

Dimension 2 provides an organizational schema for integrating and interrelating knowledge from different science domains. The eight NGSS Crosscutting Concepts are as follows:

- Patterns
- Similarity and Diversity
- Cause and Effect
- Scale, Proportion, and Quantity
- Systems and System Models
- Energy and Matter
- Structure and Function
- Stability and Change

## DIMENSION 3: DIMENSIONS AND DISCIPLINARY CORE IDEAS

Dimension 3 presents a contained set of Disciplinary Core Ideas to support deeper understanding and application of content. The following chart details Core Ideas for curriculum, instructional content, and assessments within four domains.

| LIFE SCIENCE  | PHYSICAL SCIENCE   | EARTH SCIENCE  | SPACE SYSTEMS   |
|---|--|--|---|
| <ul style="list-style-type: none"><li>• Structure and Function of Living Things</li><li>• Life Cycles and Stages</li><li>• Reproduction &amp; Inherited Traits</li><li>• Animals</li><li>• Plants</li></ul> | <ul style="list-style-type: none"><li>• Forces and Interactions</li><li>• Energy</li><li>• Light</li><li>• Sound</li><li>• Electricity/ Magnetism</li><li>• Matter</li><li>• Waves</li><li>• Heat</li><li>• Chemistry</li><li>• Information Processing</li></ul> | <ul style="list-style-type: none"><li>• Weather</li><li>• Climate</li><li>• Rocks &amp; Soil</li><li>• Erosion and Weathering</li><li>• Landforms</li><li>• Water</li><li>• Oceans</li><li>• History of Earth</li><li>• Plate Tectonics</li><li>• Volcanoes, Earthquakes, and Tsunamis</li></ul> | <ul style="list-style-type: none"><li>• Solar System</li><li>• Planets</li><li>• Moon</li><li>• Sun</li></ul> |

