Teacher's Guide

Changing with the Climer

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MAGAZINE **ARTICLES**

Welcome to a Warmer World 6 Expository Nonfiction 780L
A Walk in the Park 8 Narrative Nonfiction 950L
Attack of the Flying Squid
Eyes on the Tide
Ask Dr. Darwin
One Tough Butterfly

Ask: Changing with the Climate © March 2017

Teacher's Guide for *Ask: Changing with the Climate*

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OVERVIEW

In this magazine, readers will learn how people, plants, and animals are coping with climate change. Ask: Changing with the Climate

includes information about the causes and effects of climate change, the effects of global warming in Glacier National Park, and the ways the jumbo squid, the quino butterfly, and Pacific Islanders are adapting to life in a warmer world.

ESSENTIAL QUESTION:

How can plants and animals adapt to climate change?



Using This Guide

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 - 10

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 12 - 14

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).



Skills and Standards Overview

Essential Question: How can plants and animals adapt to climate change?

MAGAZINE ARTICLES	CORE CONTENT CONCEPT	LITERACY SKILLS	CORRESPONDING CCSS ANCHOR STANDARDS
Welcome to a Warmer World Expository Nonfiction	If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.	 Close Reading Analyze Text Structure Interpret Visual Information Research and Report 	Reading 1, 5 & 7 Speaking and Listening 1
A Walk in the Park Expository Nonfiction	If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.	 Close Reading Analyze Text Features Interpret Evidence Write Interview Questions 	Reading 1, 5 & 8 Writing 2
Attack of the Flying Squid Expository Nonfiction	If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.	 Close Reading Analyze Text Features Analyze Text Structure Write a Science Fiction Story 	Reading 1 & 5 Writing 3
Eyes on the Tide Expository Nonfiction	If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.	 Close Reading Compare Texts Analyze Word Choice Write an Editorial 	Reading 1, 3, 4 & 9 Writing 1
Ask Dr. Darwin Narrative Nonfiction	If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.	 Close Reading Analyze Tone Analyze Author's Purpose Write a Biography 	Reading 1, 4 & 6 Writing 2
One Tough Butterfly Expository Nonfiction	If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.	 Close Reading Analyze Author's Purpose Interpret Visual Information Write a Personal Narrative 	Reading 1, 3, 6 & 7 Writing 3

Comparing Texts: Reading 9

Mini-Unit: Reading 1; Writing 2 & 3; Speaking & Listening 1

ARTICLE: Welcome to a Warmer World

Magazine pages 6 - 7, Expository Nonfiction



This article describes the causes and effects of climate change and how plants and animals might react.

ESSENTIAL QUESTION

How can plants and animals adapt to climate change?

CORE CONTENT CONCEPT

Earth Science If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.

CROSS-CURRICULAR EXTENSION

Science Use the library and the internet to learn more about how climate change is affecting polar bears. Create a short report that describes these effects and what people are doing to save polar bears. Share your report with the class.

KEY VOCABULARY

cope (p. 6) to deal with problems and difficult situations and try to come up with solutions

adapt (p. 6) to change your behavior so that it is easier to live in a particular place or situation

thrive (p. 7) to grow or develop successfully

PREPARE TO READ

Display a KWL chart and explain that this article is about climate change. Discuss with students what they know and want to know about climate change, and add this information to the chart. Come back to the chart after students have read the article and work with them to fill in the last column.

CLOSE READING AND TEXT ANALYSIS

Key Ideas

- Compare climate and weather. How are they similar and different? Cite information from the article to support your answer. *CCSS Reading 3*
- Why is a rapidly warming planet dangerous for living things? Use details from the text to support your response. *CCSS Reading 1*
- How will living things probably cope if our climate continues to warm up fast? Support your ideas with details from the article. *CCSS Reading 1*

Craft and Structure

- Analyze Text Structure This science article explains climate change by describing its causes and effects. Work with a partner to list the cause-and-effect relationships in this article. *CCSS Reading 5*
- Interpret Visual Information Carefully read the words and look at the pictures in the diagram at the bottom of the page. What information from the article does this diagram help you understand? *CCSS Reading 7*

WRITING

Research and Report Adaptations are special skills or characteristics that help an animal or plant survive. Conduct research to learn about different plant and animal adaptations. Then create a collage to show what you learned.





ARTICLE: A Walk in the Park

Magazine pages 8 - 13, Narrative Nonfiction



Mike Graf has been to Glacier National Park many times over the last 30 years. In this article he describes a recent visit during which he learns how climate change is affecting glaciers, plants, and animals in the park.

ESSENTIAL QUESTION

How can plants and animals adapt to climate change?

CORE CONTENT CONCEPT

Earth Science If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.

CROSS-CURRICULAR EXTENSION

Social Studies Explore the National Park Service website for Glacier National Park. Use the information you find there to plan a trip to the park. What would you like to do and see on your visit?

KEY VOCABULARY

oblivion (p. 10) the state of being destroyed

culprit (p. 11) a person who has committed a crime or done something wrong

burrow (p. 12) to make a hole or tunnel in the ground by digging

PREPARE TO READ

Show students photos of glaciers from the internet and invite them to share anything they know about the topic of glaciers. Explain that glaciers are very large areas of ice. Tell students the next article is about Glacier National Park in Wyoming and the way climate change is affecting life there.

CLOSE READING AND TEXT ANALYSIS

Key Ideas

- What changes does Mike Graf actually observe at Glacier National Park during his visit? Cite details from the article to support your response. *CCSS Reading 1*
- Why are only 25 glaciers left in Glacier National Park? Support your response with details from the article. *CCSS Reading 1*
- How is a warmer climate affecting the pika? Use details from the article to support your response. *CCSS Reading 1*

Craft and Structure

- **Analyze Text Features** The headings in this article break up the text into smaller sections and tell you what each section is about. Work with a partner to summarize each of the sections in this article. *CCSS Reading 5*
- **Interpret Evidence** The main idea of this article is that global warming is having a negative effect on plants and animals at Glacier National Park. What evidence does the author present to support this idea? *CCSS Reading 8*

WRITING

Write Interview Questions Imagine you are going to interview Mike Graf. Write four questions for Mike that can be answered with the information in this article. For example, one question might be, "What did you see as you traveled the Going-to-the-Sun-Road 30 years ago?" For each of your questions, write Mike's answer. Then work with a partner to perform your interview for the class.



ARTICLE: Attack of the Flying Squid

Magazine pages 14 - 17, Expository Nonfiction



Learn about jumbo squid and why these strange creatures are survivors.

ESSENTIAL QUESTION

How can plants and animals adapt to climate change?

CORE CONTENT CONCEPT

Earth Science If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.

CROSS-CURRICULAR EXTENSION

Art Long ago, sailors believed an enormous sea monster called a kraken lurked below the ocean surface. Conduct research to learn more about this legendary beast. Create a small poster with a picture and information about it.

KEY VOCABULARY

predators (p. 14) animals that live by killing and eating other animals

launches (p. 14) to send or shoot something into the air or water or into outer space

edge (p. 15) an advantage over others

prey (p. 16) an animal that is hunted or killed by another animal for food

PREPARE TO READ

Discuss how students would dress and behave and what they would eat or drink to make themselves comfortable on a hot day. Note answers and explain that they are examples of how people adapt, or change, so that it's easier to live in a particular situation. Explain that this article describes how jumbo squid adapt.

CLOSE READING AND TEXT ANALYSIS

Key Ideas

- How are jumbo squid benefiting from warming oceans? Cite details from the article to support your response. *CCSS Reading 1*
- Compare El Nino with climate change. Use information from the article to describe the similarities and differences. *CSSS Reading 1*
- Describe how jumbo squid have adapted to living in warmer ocean water. Use details from the article to support your response. *CCSS Reading 1*

Craft and Structure

- Analyze Text Features This article contains headings that hint at what the different sections of the article are about. Work with a partner to summarize the information under each heading. *CCSS Reading 5*
- Analyze Text Structure This article compares the effects of climate change and the effects of El Nino on jumbo squid. Use a Venn diagram (p. 15) to record the similarities and differences in these effects. *CCSS Reading 5*

WRITING

Write a Science Fiction Story Imagine that jumbo squid adapted in strange and frightening ways that threatened humans. Write a scary science fiction story that describes the cause of the horrible adaptations and their effects. Use concrete details, description, and dialogue to weave a tale of terror.





ARTICLE: Eyes on the Tide

Magazine pages 18 - 23, Expository Nonfiction



Find out how islanders and people who live in coastal cities are adapting to the changes brought on by rising seas.

ESSENTIAL QUESTION

How can plants and animals adapt to climate change?

CORE CONTENT CONCEPT

Earth Science If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.

CROSS-CURRICULAR EXTENSION

Social Studies Create a travel brochure for the Cook or Solomon Islands. Include a map and information about historic sites, weather conditions, arts and culture, food, and other details. Use the library and internet for research.

KEY VOCABULARY

barriers (p. 22) something, such as a fence or natural obstacle, that prevents or blocks movement from one place to another

drastic (p. 22) extreme in effect or action

fossil fuels (p. 23) fuels, such as coal, oil, or natural gas, that are formed in the earth from dead plants or animals

PREPARE TO READ

Show students the location of the Solomon Islands and Cook Islands on a world map. Explain that the oceans that surround these islands are rising. Ask students how this might affect the people who live on these islands. Then explain that people living in coastal cities are also affected by rising seas.

CLOSE READING AND TEXT ANALYSIS

Key Ideas

- Why are sea levels rising? Cite details from the text to support your response. CCSS Reading 1
- How are people living on islands in the Pacific adapting to climate change? Cite details from the text to support your answer. *CCSS Reading 1*
- Compare the problems of the Solomon and the Cook Islanders. Cite details from the text to explain the similarities and differences. *CCSS Reading 3*

Craft and Structure

- **Compare Texts** Read the "Sinking Cities" text box on page 23. Compare the ways people in large cities are adapting to rising seas with the ways Pacific Islanders are adapting. How are they similar and different? *CCSS Reading 9*
- **Analyze Word Choice** What does the author of "Eyes on the Tide" mean by the phrase "change one, change all" at the bottom of page 23? What kind of global change is she talking about here? *CCSS Reading 4*

WRITING

Write an Editorial Small island nations should not have to pay for the climate change damage caused by other countries. Do you agree or disagree with this statement? Write an editorial in which you express your opinion about this. Do some research to find information you can use to support your opinion. Suggest a solution to the problem of who should pay. Then present your editorial to the class.



ARTICLE: Ask Dr. Darwin

Magazine page 24, Advice Column



Worried Warbler from Wyoming, Pika Pete from Pike's Peak, and Joshua Tree from Yosemite write letters to Dr. Darwin expressing various concerns related to climate change.

ESSENTIAL QUESTION

How can plants and animals adapt to climate change?

CORE CONTENT CONCEPT

Earth Science If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.

CROSS-CURRICULAR EXTENSION

Science How is climate change actually affecting bird migration, pikas, and Joshua trees? Conduct online research to find the facts behind the letters to Dr. Darwin. Share what you learn with the class.

KEY VOCABULARY

hospitable (p. 24) generous and friendly to guests or visitors

extinct (p. 24) no longer existing

adaptable (p. 24) able to change or be changed in order to work better in some situation

PREPARE TO READ

Ask students to share what they know about advice columns. If possible, share an appropriate example. Then explain that this article is an advice column in which animals and plants write to Dr. Darwin for advice about how to deal with the effects of climate change.

CLOSE READING AND TEXT ANALYSIS

Key Ideas

- How is being adaptable important for the survival of each animal? Cite details from the text to support your response. *CCSS Reading 1*
- How might climate change be responsible for each animal's problem? Support your response with details from the text. *CCSS Reading 1*
- Why do you think Joshua Tree refers to humans as "troublesome"? Do you agree or not agree? *CCSS Reading 1*

Craft and Structure

- **Analyze Tone** How would you describe Dr. Darwin's tone, or attitude, toward the letter-writers and their problems—annoyed, concerned, sarcastic, respectful? Which words and details reveal the tone? *CCSS Reading 4*
- **Analyze Author's Purpose** What is the author's purpose for writing this article—to entertain readers, to inform them, or to persuade them? Does the author have more than one purpose? Explain your thinking. *CCSS Reading* 6

WRITING

Write a Biography Conduct research to learn about the real Dr. Darwin—Charles Darwin. Find out when he lived and why he is famous. Learn about his childhood, his research, and his important theories. Write a short biography of him and share it with classmates.





ARTICLE: One Tough Butterfly

Magazine pages 25 - 27, Expository Nonfiction



Quino butterflies depend on dwarf plantain plants to survive. Climate change and habitat destruction have made it difficult for these plants to grow well, but quino butterflies have been able to adapt quickly and survive.

ESSENTIAL QUESTION

How can plants and animals adapt to climate change?

CORE CONTENT CONCEPT

Earth Science If Earth's global mean temperature continues to rise, the lives of humans and other organisms will be affected in many different ways.

CROSS-CURRICULAR EXTENSION

Science An object that is exactly the same on both sides has symmetry. Butterfly wings are a good example of symmetry. Look at butterfly pictures in books or online. Then create a drawing of a butterfly that shows symmetry.

KEY VOCABULARY

wilt (p. 26) to bend over because of not having enough water

conservationist (p. 26)

someone who works to protect animals, plants, and natural resources

host (p. 27) an animal or plant in which another animal or plant lives and gets its food or protection

DNA (p. 27) a substance that carries genetic information in the cells of plants and animals

PREPARE TO READ

Explain that as a result of climate change and habitat destruction, quino butterflies were having a hard time finding food where they live. Discuss with students the negative and positive outcomes that could result from this situation. Then tell students to read the article to learn what actually happened.

CLOSE READING AND TEXT ANALYSIS

Key Ideas

- Describe the relationship between quino butterflies and dwarf plantain plants.Cite details from the text to support your response. *CCSS Reading 3*
- What happened to dwarf plantains as a result of climate change and human activity? Use details from the text to support your response. *CCSS Reading 1*
- How did the quino butterflies adapt to the changes in their environment? Support your response with information from the article. *CCSS Reading 3*

Craft and Structure

- **Analyze Author's Purpose** Authors write to persuade, entertain, inform, or express an opinion. Why did this author write about quino butterflies? Which details in the article helped you determine the purpose? *CCSS Reading 6*
- Interpret Visual Information Study the illustrations. What ideas in the text do these illustrations help you understand? How would you describe the mood, or feeling, of these illustrations? *CCSS Reading 7*

WRITING

Write a Personal Narrative Have you ever heard the saying "when the going gets tough, the tough get going"? It means that when a situation becomes difficult, strong people work hard to resolve the problem. Write about a time when you found yourself in a difficult situation. Describe what you did to solve problems.

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).

- What is climate change? Use information from "Welcome to a Warmer World" and at least one other article to write a paragraph that answers this question.
- How do plants and animals (including humans) affect the environment? How are they affected by the environment? Write a short essay to respond to these questions. Use information from "Welcome to a Warmer World," "A Walk in the Park," and at least one other article to support your ideas.
- How is climate change affecting food sources for different animals? Use information from "A Walk in the Park," "Attack of the Flying Squid," and "One Tough Butterfly" to write a paragraph that answers this question.
- Which plants and animals in the magazine are survivors? Which ones are suffering? Make a T-chart with the headings "Survivors" and "Sufferers." Record plants and animals in the chart. Then get together with a classmate to compare information.
- Do plants and animals choose to adapt? Do humans? Discuss these questions with a small group of classmates. Draw on information from "One Tough Butterfly," "Eyes on the Tide," and any other articles you choose for your discussion.

MINI-UNIT

EXPLORATORY LEARNING - FLEXIBLE MINI-UNIT DESIGN

ENGAGE

READ FOR A PURPOSE

APPLY

This mini-unit offers students an opportunity for an in-depth look at how plants and animals (including humans) are affected by and adapting to life in a warmer world. Students will review the problems global warming is causing for plants and animals. Next, they will work in groups to gather information from the magazine about one of these plants or animals. Finally, groups will choose creative ways to convey information about their topics.

ENGAGE: Engage students in the topic of adaptation by first reviewing the Essential Question: How do plants and animals adapt to climate change? Display a chart like the one below and discuss the different ways that animals, plants, and humans have been affected by a warmer planet.



READ FOR A PURPOSE

INTRODUCE THE ACTIVITY: Changing with the Climate Tell students that they will be working in groups to report on a plant or animal (including humans) from the magazine that has been affected by global warming. Continue by explaining that they will describe these effects and the way the plant or animal has changed—or could change—as a result. Finally, explain that groups will come up with creative ways to convey this information. Offer the following options for creative reports and invite students to suggest others.

- skit
- poem with illustrations
- presentation with visuals
- comic strip
- advice letter or blog

Now, divide the class into small groups.

RETURN TO THE TEXT: Explain to students that before they can develop their creative reports, they need to look through the magazine to choose a specific plant, animal, or group of people and then gather information about it. Allow time for groups to choose topics. Then distribute a copy of the Project Notes chart (p. 14) and have groups use it to record information from the magazine.

After completing this step, allow groups time to brainstorm ideas for their reports and choose a format.

APPLY: CHANGING WITH THE CLIMATE Now that groups have gathered information from the magazine, they are ready to develop their creative reports.

MATERIALS

- completed Project Notes chart
- art supplies as needed
- poster board or presentation software as needed

STEP 1: Build Background

Explain that groups need to plan the steps of their project and then follow these steps. Offer to meet with individual groups as necessary. Display these guidelines and tell students to use them to help them as they work together:

- Define individual roles and tasks for group members (note-taker, for example).
- Solve problems and make decisions collaboratively.
- Listen to each other and be respectful.

STEP 2: Brainstorm and Begin

Allow groups time to brainstorm the tasks they need to complete for their projects. Remind students to try to work problems out together and to confer with you if they need suggestions.

STEP 3: Review, Revise, Finalize

Groups will probably complete their projects at different times. Remind them to go over their work to make sure it is accurate and clear as well as creative. Suggest that students make revisions or hold rehearsals now.

STEP 4: Share

Allow groups to present their projects to the class and encourage students to offer a round of applause for each group's creative efforts. Invite groups to describe their creative process and discuss the challenges and benefits of working together.

NAME:	
PI	ROJECT NOTES
Our topic is:	
Habitat	Effects of global warming on habitat
Changes/adaptation	If plant/animal has not adapted, what are its
	options for survival?



Appendix 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

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

CRAFT AND STRUCTURE

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

INTEGRATION OF KNOWLEDGE AND IDEAS

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

WRITING

Write arguments to support claims, using valid reasoning and relevant	Writing 1	
and sufficient evidence.		
Write informative/explanatory texts to examine and convey complex	Writing 2	
ideas and information clearly and accurately.		
Write narratives to develop real or imagined experiences or events.	Writing 3	
Draw evidence from literary or informational texts to support analysis,	Writing 0	
reflection, and research.	writing 9	
Conduct short as well as more sustained research projects.	Writing 10	



CORE INSTRUCTIONAL CONCEPTS: SOCIAL STUDIES

C3 INQUIRY ARC DIMENSION 2: APPLYING DISCIPLINARY CONCEPTS AND TOOLS	STATE OR DISTRICT STANDARD

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

ECONOMICS

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

GEOGRAPHY

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

HISTORY

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

Stages

Animals

Plants

Structure and

Living Things

Life Cycles and

Reproduction &

Inherited Traits

Function of

- PHYSICAL SCIENCE
 - Forces and Interactions
- Energy
- Light
- Sound
- Electricity/ Magnetism
- Matter
- Waves
- Heat
- Chemistry
- Information Processing

- EARTH SCIENCE
 Weather
 - Climate
 - Rocks & Soil
 - Erosion and
 - WeatheringLandforms
 - Water
 - Oceans
 - History of Earth
- Plate Tectonics
- Volcanoes,
- Earthquakes, and Tsunamis

- SPACE SYSTEMS
- Solar System
- Planets
- Moon • Sun

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