

# Teacher's Guide

muse®

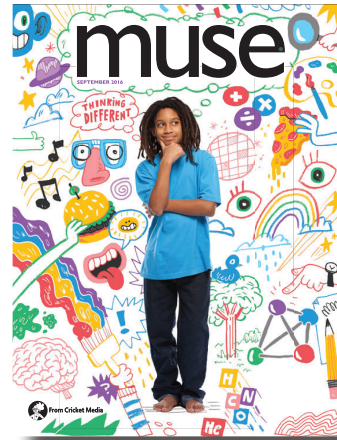
SEPTEMBER 2016

MAGAZINE  
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## Teacher's Guide for *Muse: Thinking Different*

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## OVERVIEW

*In this magazine, readers will learn how strength and survival lies in embracing our differences.*

***MUSE: Thinking Different*** includes information

*about living with autism and ADHD and explores environmental adaptation and neurodiversity in various species.*

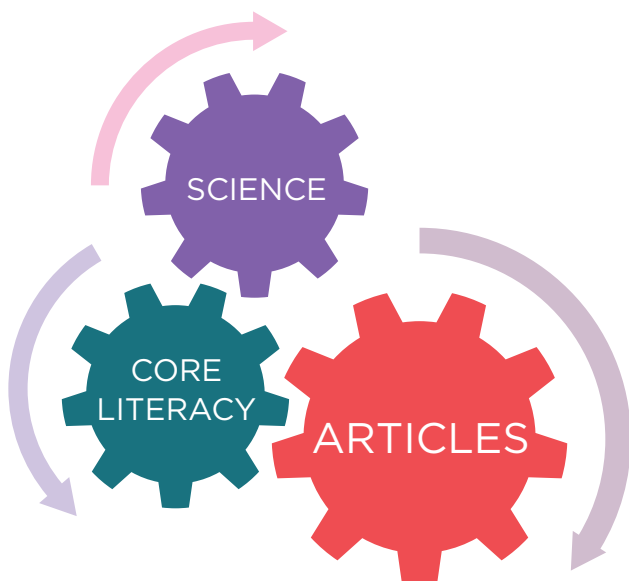
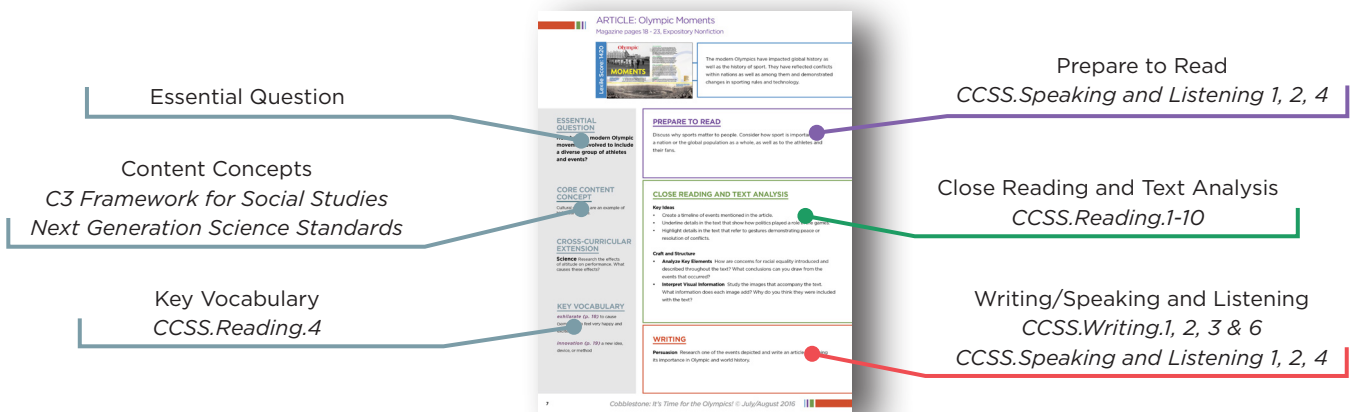
## ESSENTIAL QUESTION:

***How do diversity and adaptation affect animals and humans?***

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 - 9

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 11 - 13

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:** How do diversity and adaptation affect animals and humans?

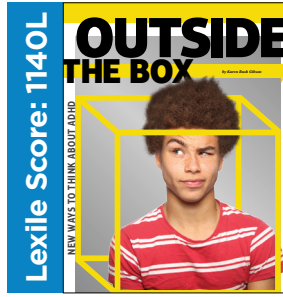
MAGAZINE ARTICLES	SCIENCE CONCEPTS	LITERACY SKILLS	CORRESPONDING CCSS ANCHOR STANDARDS
<b>Outside the Box</b> Expository Nonfiction	Differences in characteristics between individuals of the same species provide advantages.	<ul style="list-style-type: none"> <li>Close Reading</li> <li>Analyze Text Structure</li> <li>Analyze Tone</li> <li>Write Narrative Texts</li> </ul>	<i>Reading 1, 2, 5 &amp; 6</i> <i>Writing 3</i>
<b>The Boy Who Couldn't Play</b> Expository Nonfiction	Individuals of the same species are similar but can vary in many ways.	<ul style="list-style-type: none"> <li>Close Reading</li> <li>Interpret Phrases</li> <li>Analyze Purpose</li> <li>Write Opinions</li> </ul>	<i>Reading 1, 2, 4 &amp; 6</i> <i>Writing 1</i>
<b>In Our Words</b> Narrative Nonfiction	Differences among individuals of the same species provide opportunities for growth and adaptation.	<ul style="list-style-type: none"> <li>Close Reading</li> <li>Draw Inferences</li> <li>Compare Texts</li> <li>Write Explanatory Texts</li> </ul>	<i>Reading 1, 2 &amp; 9</i> <i>Writing 2</i>
<b>Reasoning Like a Raven</b> Expository Nonfiction	Observations made while testing hypotheses can provide new insights into phenomena.	<ul style="list-style-type: none"> <li>Close Reading</li> <li>Analyze Text Structure</li> <li>Analyze Point of View</li> <li>Write Arguments</li> </ul>	<i>Reading 1, 2, 5 &amp; 6</i> <i>Writing 1</i>
<b>Mystery of the White Monarch</b> Expository Nonfiction	Human activities have had a profound impact on the environment.	<ul style="list-style-type: none"> <li>Close Reading</li> <li>Interpret Phrases</li> <li>Analyze Text Structure</li> <li>Research and Write</li> </ul>	<i>Reading 1, 4 &amp; 5</i> <i>Writing 2 &amp; 7</i>
<b>The Quietest Leaders</b> Expository Nonfiction	Differences among individuals of the same species provide opportunities for growth and adaptation.	<ul style="list-style-type: none"> <li>Close Reading</li> <li>Analyze Purpose</li> <li>Evaluate Evidence</li> <li>Collaborate</li> </ul>	<i>Reading 1, 2, 6 &amp; 8</i> <i>Speaking &amp; Listening 1</i>

**Comparing Texts:** CCSS Reading 9

**Mini-Unit:** CCSS Reading 1, Reading 7, Writing 2, Writing 9, Writing 10

# ARTICLE: Outside the Box

Magazine pages 9-12, Expository Nonfiction



This article invites the reader to celebrate neurodiversity and to embrace the differences in our brains. “Outside the Box” offers a fresh, positive perspective to replace the negative stigma that is often attached to ADHD.

## ESSENTIAL QUESTION

**How do diversity and adaptation affect animals and humans?**

## CORE CONTENT CONCEPT

**Science** Differences in characteristics between individuals of the same species provide advantages.

## CROSS-CURRICULAR EXTENSION

**Mathematics** Make a graph depicting the rise in ADHD diagnoses. Explain the data using numbers and words.

## KEY VOCABULARY

**impulsivity (p. 11)** the tendency to act without careful thought

**neurodiversity (p. 12)** the idea that people experience the world differently based on variations in the brain

## PREPARE TO READ

Assign the class a specific task of your choosing and purposely create noticeable distractions. (Use light, sound, smell, and motion.) After a limited time, question the class about how they felt during the experience. Then, explain that the following article will focus on the challenges of living with ADHD.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- Underline the sentences in the text that clearly demonstrate the challenges of living with ADHD. *CCSS Reading 1*
- ADHD can provide unique advantages in various lifestyle and career choices. Highlight passages in the text that focus on the benefits of this “disorder.” *CCSS Reading 1*
- Explain the procedure and treatments for an ADHD diagnosis. Cite evidence from the text. *CCSS Reading 2*

### Craft and Structure

- Analyze Text Structure** Notice that the author began the article by discussing the difficulties of ADHD and transitioned into the positive aspects. Locate the transition sentences in the text and explain why this technique helps the reader gain new perspective. *CCSS Reading 5*
- Analyze Tone** Locate sections of the text where the author spotlights famous people thriving with ADHD. How does the author’s use of this information contribute to the overall tone of the article? *CCSS Reading 6*

## WRITING

**Write Narrative Texts** Write a short essay portraying how you, someone you know, or someone you’ve researched who has a disability or disorder is currently thriving. Provide details and be prepared to share your work with the class.



# ARTICLE: The Boy Who Couldn't Play

Magazine pages 14-17, Expository Nonfiction



Delve into the life of a four-year-old boy with autism spectrum disorder. Read about the challenges “The Boy Who Couldn’t Play” faces and the methods currently used for overcoming social and behavioral obstacles.

## ESSENTIAL QUESTION

**How do diversity and adaptation affect animals and humans?**

## CORE CONTENT CONCEPT

**Science** Individuals of the same species are similar but can vary in many ways.

## CROSS-CURRICULAR EXTENSION

**Social Studies** Research how the treatment of people with disabilities/disorders has changed since the early 1800s. How has treatment improved?

## KEY VOCABULARY

**imitation (p. 16)** the act of copying something

**redirect (p. 17)** to change path or direction

**reinforcer (p. 16)** something that encourages or gives support to

## PREPARE TO READ

Display a K-W-L chart for students titled “Autism.” Record what the students know and want to know. Inform the class that after reading the article, they will complete the “learned” column.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- Which characteristic of the autism spectrum disorder depicted in this article makes it most difficult for this population to assimilate with society? Support your answer with details from the text. *CCSS Reading 1*
- Summarize the key ideas of this article and share it with someone who has not read the article. *CCSS Reading 2*

### Craft and Structure

- Interpret Phrases** Behavioral consultants use the phrase, “lost in their own little world” to describe some of the autistic population. Locate the phrase in the text and interpret its meaning. *CCSS Reading 4*
- Analyze Purpose** What is the author’s purpose for writing this article? How do you know? Examine the audience, tone, and structure of the text. Locate the sentences that support your conclusion. *CCSS Reading 6*

## WRITING

**Write Opinions** Highlight sections in the text that describe teaching James how to play. If the nature of play is supposed to be joyous, what is your opinion about having James play with other kids even though this may not be fun for him? Support your opinion with details from the text. *CCSS Writing 1 & 6*

# ARTICLE: In Our Own Words

Magazine pages 18-19, Narrative Nonfiction



This article features revealing commentary from two engaging teenagers with autism. Their strength of character and determination to overcome obstacles will leave the reader both inspired and better informed.

## ESSENTIAL QUESTION

**How do diversity and adaptation affect animals and humans?**

## CORE CONTENT CONCEPT

**Science** Differences among individuals of the same species provide opportunities for growth and adaptation.

## CROSS-CURRICULAR EXTENSION

**Special Education** Research accommodations provided for students with special needs within your own school district. Tell why they are/are not adequate.

## KEY VOCABULARY

**conversing (p. 19)** talking informally

**ideal (p. 19)** exactly right for a particular purpose, person or situation

**sufficiently (p. 19)** having as much as is needed

## PREPARE TO READ

Pose the question, “How do our differences provide opportunities for growth?” Record students’ answers. Then, ask students what they know about living with autism. Explain that this article will give the reader insight into the challenges of being a teenager with autism.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- Compare the central themes of Gabriela’s and Milan’s essays. Discuss differences and similarities, citing details from the text. *CCSS Reading 2*
- Underline the specific situations mentioned in the article that can cause difficulty for a teenager with autism. *CCSS Reading 1*

### Craft and Structure

- **Draw Inferences** Based on the two commentaries, would Gabriela and Milan be well-matched friends? Cite evidence from the text to support your answer. *CCSS Reading 1*
- **Compare Texts** Compare Gabriela’s and Milan’s texts. In what ways do they address the topic of autism similarly? Differently? *CCSS Reading 9*

## WRITING

**Write Explanatory Texts** Using information from the text and your own research, compile a guide that will help allistic (non-autistic) individuals more efficiently communicate and socialize with autistic individuals.

# ARTICLE: Reasoning Like a Raven

Magazine pages 20-23, Expository Nonfiction



Take flight and discover how the corvid family of birds boast an intelligence that rivals that of the human brain. Learn the theory of convergent evolution and how it applies to brain functioning.

## ESSENTIAL QUESTION

**How do diversity and adaptation affect animals and humans?**

## CORE CONTENT CONCEPT

**Science** Observations made while testing hypotheses can provide new insights into phenomena.

## CROSS-CURRICULAR EXTENSION

**Mathematics** Use the “brain-to-body” ratio discussed in this article to assess the intelligence and reasoning abilities of various animals.

## KEY VOCABULARY

**convergent (p. 23)** coming together toward one point or goal

**crafty (p. 21)** clever in a deceptive way

**devour (p. 21)** to quickly eat or destroy completely

## PREPARE TO READ

Ask students “How does human intelligence compare to animal intelligence?” Discuss the factors that might directly affect different levels of understanding and functioning in an organism.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- Why are the corvids considered such impressive creatures in the animal kingdom? Cite evidence from the text. *CCSS Reading 1*
- Explain the “brain-to-body” ratio discussed in the text. What are the implications of this principle? *CCSS Reading 1*
- Locate the section of the article that discusses scavengers. Define their role, habits and contributions. *CCSS Reading 2*

### Craft and Structure

- **Analyze Text Structure** For what purpose does the author use Aesop’s “The Crow and the Pitcher”? Explain the meaning of the passage as it relates to the rest of the article. *CCSS Reading 5*
- **Analyze Point of View** Locate specific words, phrases, sentences, and paragraphs in the text that reveal the author’s point of view on the topic. How does the author’s point of view shape the content and style of the text? *CCSS Reading 6*

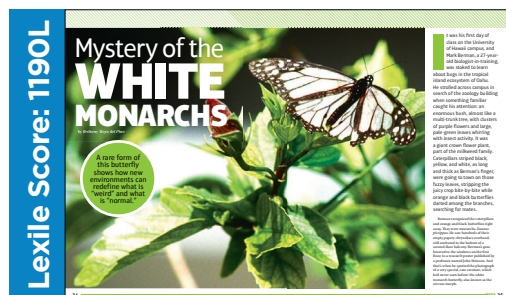
## WRITING

**Write Arguments** Use supporting evidence from the text and your own research to explain whether the brain-to-body ratio principle is a reliable way to determine the relative intelligence and reasoning abilities of different species. Be sure to support your argument and evaluate any counterclaims to your position.



# ARTICLE: The Mystery of the White Monarchs

Magazine pages 34-39, Expository Nonfiction



Uncover “The Mystery of the White Monarchs” by reading about the genetic changes that can occur as a result of environmental factors. How can an entire species be altered by subtle shifts in its surroundings?

## ESSENTIAL QUESTION

**How do diversity and adaptation affect animals and humans?**

## CORE CONTENT CONCEPT

**Science** Human activities have had a profound impact on the environment.

## CROSS-CURRICULAR EXTENSION

**Art** Have the students draw a white insect shape in nature on a piece of paper and create the appropriate camouflage for its environment.

## KEY VOCABULARY

**anchored (p. 35)** to connect to a solid base

**defective (p. 38)** having a flaw

**outlier (p. 36)** something situated away from the main body or system

## PREPARE TO READ

Show the class various photos of camouflage in nature. Discuss how this feature helps to protect a particular species. Ask students, “Why is adaptation a crucial component of survival?”

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- Using specific details from the text, explain why it is so rare to see a white monarch. *CCSS Reading 1*
- Why does being an outlier make a species a prime target for predators? Give examples to support this statement. *CCSS Reading 1*

### Craft and Structure

- Interpret Phrases** How can new environments redefine what is “weird” and what is “normal”? Select specific passages from the text to formulate your answer. *CCSS Reading 4*
- Analyze Text Structure** The text discusses many cause and effect relationships that exist between man and nature. Why is this structure an effective way to discuss the adaption of white monarch butterflies? *CCSS Reading 5*

## WRITING

**Research and Write** Conduct research to find other examples of how changes in the environment affect nature and the existence of certain species. Write a short essay describing your findings.

# ARTICLE: The Quietest Leaders

Magazine pages 42-45, Expository Nonfiction



Explore the advantages of being an introvert or an extrovert in “The Quietest Leaders.” Learn how individual differences in both the animal and human world impact the survival and strength of various species.

## ESSENTIAL QUESTION

**How do diversity and adaptation affect animals and humans?**

## CORE CONTENT CONCEPT

**Science** Differences among individuals of the same species provide opportunities for growth and adaptation.

## CROSS-CURRICULAR EXTENSION

**Math** Guide students to create a scale from positive to negative. Then, invite them to conduct a poll to capture other students’ opinions of whether introverted and extroverted behaviors are positive, negative, or somewhere in between.

## KEY VOCABULARY

**introvert (p. 42)** a shy or quiet person who may find it difficult to socialize

**extrovert (p. 43)** an outgoing person who prefers to be with other people

## PREPARE TO READ

Create a T-chart on the board titled “Introverts” and “Extroverts.” Ask for class participation to fill in the chart with characteristics and examples for each heading. Guide the class to consider both the positive and negative aspects of each personality type when completing the chart.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- Explain how the chemical dopamine works in the brain. Underline the sentences that support your answer. *CCSS Reading 1*
- Identify the main idea of the text and summarize supporting details. *CCSS Reading 1 & 2*

### Craft and Structure

- Analyze Purpose** Why does the author discuss both humans and animals when describing the traits of introverts and extroverts? How does this help communicate the main idea of the text? *CCSS Reading 6*
- Evaluate Evidence** The author states that both extroverted and introverted behaviors have certain advantages. Evaluate the evidence used to support these claims. Is the evidence sufficient? *CCSS Reading 8*

## SPEAKING AND LISTENING

**Collaborate** With a partner, discuss whether you are an introvert or an extrovert. Include specific details and discuss situations when possessing this trait has had a positive or a negative influence on your life.



### 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*).

- The articles “The Boy Who Couldn’t Play” and “In Our Own Words” describe the different spectrums of autism disorder. Use information from the text to discuss the similarities and differences. What key factors determine possible levels of functioning within society?
- “Outside the Box” and “Mystery of the White Monarchs” contain very different content, but include a secondary theme, “Weird is the new normal.” Locate evidence in the texts to support this alternate topic.
- Underline the passages in “The Quietest Leaders” and “Outside the Box” that refer to dopamine. How does this chemical in the brain affect behaviors and traits?
- “Reasoning Like a Raven” and “The Quietest Leaders” discuss the reasoning capabilities of certain animals. What factors affect the ability to reason in the animal kingdom? Locate text that supports how genetics and awareness both play a part.
- Reread the feature articles and highlight sections that emphasize adaptation. How is this a necessary component for survival in both the human and animal worlds?





## EXPLORATORY LEARNING - FLEXIBLE MINI-UNIT DESIGN

## ENGAGE

READ FOR A  
PURPOSE

## APPLY

**ENGAGE:** Engage students in the topic of adaptation and diversity by focusing on the Essential Question: How do diversity and adaptation affect animals and humans? Ask students to locate photos and details from the text showing or explaining different adaptations and diverse ways of thinking in humans and animals. Then, guide them in completing the chart below. Explain to students that they will be investigating how environmental changes as well as genetic and/or behavioral adaptations have positively impacted different species.

## ADAPTATIONS

## ENVIRONMENTAL

## GENETIC OR BEHAVIORAL

Changes in wing color due to pollution	Bigger brains provide reasoning skills



**READ FOR A PURPOSE**

**INTRODUCE THE ACTIVITY: “FOCUS ON THE POSITIVE” POSTER** In this activity the class will focus on the benefits of adaptation and diversity. Tell students they will be researching different forms of adaption and diversity in both humans and animals. They will then create posters highlighting why being different can be essential for survival. They will include cited examples, their own summaries, and pictures.

**RETURN TO THE TEXT:** Explain to students that before they can design their posters, they must gather information about the benefits of adaptation from the articles and through independent research. Have the students return to the texts below and direct them to note passages in which thinking differently had positive results. The Divergent Thinking graphic organizer will be a useful tool in organizing this information.

- “Outside the Box”
- “In Other Words”
- “Reasoning Like a Raven”
- “The Quietest Leaders”







**APPLY: “FOCUS ON THE POSITIVE” POSTER:** In the **ENGAGE** activity, students were asked to identify adaptations. In the **APPLY** activity, you will be asking students to go a step further and determine how these differences in thinking, behavior and appearances are positive. Be sure the students see this connection; guide them if necessary before you begin the activity phase.

### Materials Needed

- Poster board
- Markers
- Books and/or online access to materials on animal and human adaptations and diversity

**STEP 1: INFORM** Explain to the class that they will be making a poster to display how differences in thinking, behavior, and appearance can have a positive impact on animals and humans.

**STEP 2: ORGANIZE** Arrange students into small groups. Distribute a copy of the Divergent Thinking graphic organizer from this guide. Review instructions on how to complete each section. Explain that this will be a useful tool when creating their posters.

**STEP 3: RESEARCH** Instruct students to complete their graphic organizers as a group.

**STEP 4: BRAINSTORM** After groups have completed the graphic organizer using their assigned article(s) and other research materials, have them decide on a specific focus for the poster, as well as the layout. Remind them to include illustrations as well as text describing the positive benefits of the adaptation(s).

**STEP 5: CREATE POSTERS** Allow student groups time to create their posters.

**STEP 6: PRESENT** Have each group present their work and discuss it with the class. Posters should then be displayed for others to see. Everyone benefits from a positive message!



NAME: \_\_\_\_\_

## DIVERGENT THINKING

<b>Record</b> Article Title or Research Source	<b>Cite</b> Specific example of adaptation from text	<b>Describe</b> Positive benefit



## 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
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### 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.

<b>LIFE SCIENCE</b>	<b>PHYSICAL SCIENCE</b>	<b>EARTH SCIENCE</b>	<b>SPACE SYSTEMS</b>
<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>

