

Teacher's Guide

' muse®

OCTOBER 2016

MAGAZINE ARTICLES

Lighting It Up	9
Expository Nonfiction	900L
Battle of the Bionics	12
Expository Nonfiction	1100L
Real Sports, Virtual Reality	26
Expository Nonfiction	1070L
Baseball by the Numbers	32
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Teacher's Guide for *Muse: Gear + Games*

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OVERVIEW

*In this magazine, readers will learn how technology plays an integral role in enhancing the way people play and enjoy sports. **Muse: Gear + Games** includes*

information about cutting-edge technology, who is using it and what effect it has on everything from game performance to daily living.

ESSENTIAL QUESTION:

How does technology change the way people play and observe games?

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.

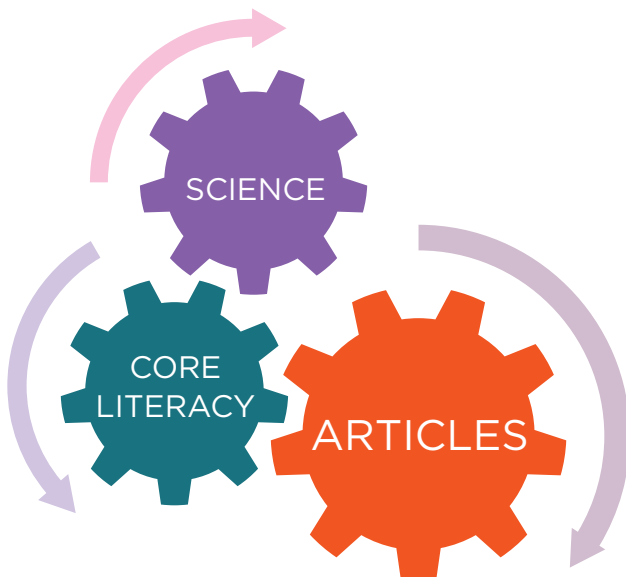
READ INDIVIDUAL ARTICLES PAGES 4 - 8

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: How does technology change the way people play and observe games?

MAGAZINE ARTICLES	SCIENCE CONCEPTS	LITERACY SKILLS	CORRESPONDING CCSS ANCHOR STANDARDS
Lighting It Up Expository Nonfiction	The uses of technologies are driven by individual or societal needs, desires, and values.	<ul style="list-style-type: none"> Close Reading Analyze Tone Analyze Relationships Write an Opinion Essay 	<i>Reading 1, 2, 3 & 4</i> <i>Writing 1</i>
Battle of the Bionics Expository Nonfiction	When new technologies become available, they can bring about changes in the way people live and interact with one another.	<ul style="list-style-type: none"> Close Reading Analyze Text Structure Determine Main Idea Write a Personality Profile 	<i>Reading 1, 2 & 5</i> <i>Writing 2</i>
Real Sports, Virtual Reality Expository Nonfiction	The more precisely a design task's criteria and constraints can be defined, the more likely it is that the design solution will be successful.	<ul style="list-style-type: none"> Close Reading Analyze Relationships Make Inferences Collaborate 	<i>Reading 1 & 3</i> <i>Speaking and Listening 1</i>
Baseball by the Numbers Expository Nonfiction	Patterns can be used to identify cause and effect relationships.	<ul style="list-style-type: none"> Close Reading Interpret Visual Information Make Inferences Create a Baseball Card 	<i>Reading 1 & 7</i> <i>Speaking and Listening 4</i>
Fighting Back Expository Nonfiction	The motion of an object is determined by the sum of the forces acting on it.	<ul style="list-style-type: none"> Close Reading Make Inferences Summarize Details Write a Persuasive Letter 	<i>Reading 1, 2 & 3</i> <i>Writing 1</i>

Comparing Texts: CCSS Reading 1, 2, 4 & 9; CCSS Writing 2, 7 & 9

Mini-Unit: CCSS Reading 1, 7 & 9; CCSS Writing 7; Speaking & Listening 1 & 4



An ad campaign called Rise for Nike combines technology, basketball superstars, and reality TV in order to inspire a new generation of basketball fans in China and throughout the world.

ESSENTIAL QUESTION

How does technology change the way people play and observe games?

CORE CONTENT CONCEPT

Science The uses of technologies are driven by individual or societal needs, desires, and values.

CROSS-CURRICULAR EXTENSION

Social Studies Trace the history of basketball from its origins in the U.S. to its growing popularity in other countries.

KEY VOCABULARY

camaraderie (p. 10) a feeling of good friendship among the people in a group

maneuvers (p. 11) clever or skillful actions or movements

PREPARE TO READ

Ask students if they've ever attended a professional sports event, such as a baseball or soccer game. Invite them to describe the atmosphere and the interactions between players and fans. Then discuss why businesses often use professional athletes as spokespersons to promote their products.

CLOSE READING AND TEXT ANALYSIS

Key Ideas

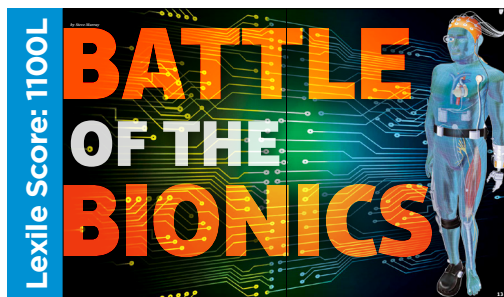
- How have ideas about sports changed in China? Cite examples from the text to support your answer. *CCSS Reading 1*
- Why is Fan Hong Hao called "the most inspiring player" in the article? Cite text details to support your answer. *CCSS Reading 1*
- How might China's enthusiasm for basketball have influenced the design of the House of Mamba? Support your ideas with information from the text. *CCSS Reading 2*

Craft and Structure

- **Analyze Tone** How would you describe the author's attitude toward the Rise for Nike campaign and the House of Mamba program? Examine the information and details in the article to determine the tone. *CCSS Reading 4*
- **Analyze Relationships** Find examples of how Duan Evans and his team combined old and new ideas in the development and creation of the House of Mamba. Record them in a two-column chart. *CCSS Reading 3*

WRITING

Write an Opinion Essay Duan Evans believes there's no end to the use of technology in basketball. Do you agree, or do you think there's a limit to what technology can do for this sport? Write an essay arguing your position. Use information from the article and your own research to support your ideas.



The inaugural Cybathlon competition takes place this month in Zurich, Switzerland. These games are about more than winning a medal. They're about taking the "dis" out of disability.

ESSENTIAL QUESTION

How does technology change the way people play and observe games?

CORE CONTENT CONCEPT

Science When new technologies become available, they can bring about changes in the way people live and interact with one another.

CROSS-CURRICULAR EXTENSION

Physical Education Try your hand at modifying a game or an activity in order to make it wheel-chair accessible. Which of the new technologies described in this article might be helpful?

KEY VOCABULARY

prosthetic (p. 14) an artificial device that replaces a missing or injured part of the body

PREPARE TO READ

Take a class poll to find out how many students watched the summer Olympic and Paralympic games. Have students speculate about what motivates these athletes to compete. Write students' ideas on the board .

CLOSE READING AND TEXT ANALYSIS

Key Ideas

- How is the Cybathlon similar to and different from the Olympic and Paralympic games? Cite details from the text to support your answer. *CCSS Reading 1*
- What different reasons do pilots have for wanting to compete in the Cybathlon? Find details in the text to support your answer. *CCSS Reading 1*
- In what ways have new technologies changed and improved life for the people in the article? What new opportunities are available because of these technologies? Support your answer with details from the text. *CCSS Reading 2*

Craft and Structure

- **Analyze Text Structure** How do the subheads help visually organize the information in this article? Turn each subhead into a question. Then read to find the answer. *CCSS Reading 5*
- **Determine Main Idea** The author of the article states that the slogan "Redefining Ability" captures the spirit of the Cybathlon. What does the author mean by this? Use details from the article to support your ideas. *CCSS Reading 2*

WRITING

Write a Personality Profile Use the internet to find out more about the pilots who are planning to compete in the Cybathlon. Write a brief description of 1-2 pilots. Include quotes, interesting details, and anecdotes. Be sure to cite your sources.



Technological advancements have raised virtual reality to a new level. Now sports fans can feel as if they are right on the sidelines or—even better—as if they are in the game!

ESSENTIAL QUESTION

How does technology change the way people play and observe games?

CORE CONTENT CONCEPT

Science The more precisely a design task's criteria and constraints can be defined, the more likely it is that the design solution will be successful.

CROSS-CURRICULAR EXTENSION

Language Arts Science fiction author Ray Bradbury often wrote about technology and its effects. Read one or more of his classic stories. What views about technology are expressed in them?

KEY VOCABULARY

accelerometer (p. 28) a device that senses motion and speed

PREPARE TO READ

Invite students to share what they know about virtual reality and to describe their experiences with it. Discuss students' ideas about virtual reality—is it mainly for fun or does it have practical purposes?

CLOSE READING AND TEXT ANALYSIS

Key Ideas

- The concept of virtual reality has been in existence for almost 50 years. Why has it taken so long for it to become popular? Cite text information in your answer. *CCSS Reading 1*
- Locate evidence in the article to support the idea that VR is more than just a game. *CCSS Reading 1*

Craft and Structure

- Analyze Relationships** How is VR being used today? What future uses are possible? Create a two-column chart with the headings "Current Uses" and "Possible Uses." Go back through the article and add information to the chart. *CCSS Reading 3*
- Make Inferences** The author states that VR has endless possibilities. Work with a partner to brainstorm ten suggestions for using VR in different situations. For example, consider possibilities connected to education, theater, art, music, politics, and medicine. *CCSS Reading 1*

SPEAKING AND LISTENING

Collaborate Look at the photos and illustrations accompanying the article. Do people seem to interact when they use VR or are they mainly on their own? With a group, discuss possible positive and negative effects of VR on human relationships and society.

ARTICLE: Baseball by the Numbers

Magazine pages 32 - 35, Expository Nonfiction



Sabermetricians are math-minded baseball fans who have figured out better ways to analyze ball players and their capabilities. Successful sabermetricians are now employed by many major league baseball teams.

ESSENTIAL QUESTION

How does technology change the way people play and observe games?

CORE CONTENT CONCEPT

Science Patterns can be used to identify cause and effect relationships.

CROSS-CURRICULAR EXTENSION

Career Planning Conduct research to find out how statistics are used in advertising, medicine, insurance, and the stock market.

KEY VOCABULARY

statistics (p.32) numbers that represents a pieces of information, such as information about how often something is done and how common something is

PREPARE TO READ

Ask students to name their favorite baseball teams and invite students to share what they know about baseball statistics. If possible, display some baseball cards that list statistics. Explain that baseball statistics are used to measure players' abilities.

CLOSE READING AND TEXT ANALYSIS

Key Ideas

- Why are patterns important in the work of sabermetricians? Use information from the text to support your answer. *CCSS Reading 1*
- In what ways did Bill James have a lasting effect on baseball? Cite details from the text in your answer. *CCSS Reading 1*
- How might technology affect sabermetrics? Use information from the text to support your answer. *CCSS Reading 1*

Craft and Structure

- **Interpret Visual Information** Study the graphs and charts on pages 33-35. How do these visuals add to your understanding of the work of sabermetricians? *CCSS Reading 7*
- **Make Inferences** Pretend you are a sabermetrician and state how your work has improved baseball. Then pretend you are a scout and explain why you want to hire a sabermetrician as part of your staff. Work with a partner on this activity. *CCSS Reading 1*

SPEAKING AND LISTENING

Create a Baseball Card Choose a baseball player from the past or present and create a large baseball card for him. Research the player's statistics to learn what they mean and add them to one side of the card. Then draw a picture of the player on the other side. Present your card to the class.



Roller derby began as a low-cost form of entertainment during the Great Depression. Today, its popularity is on the rise once again. Though the rules have changed over time, the sport still attracts tough competitors with colorful names.

ESSENTIAL QUESTION

How does technology change the way people play and observe games?

CORE CONTENT CONCEPT

Science The motion of an object is determined by the sum of the forces acting on it.

CROSS-CURRICULAR EXTENSION

Social Studies Roller derby was invented during the Great Depression. Conduct research to find out why it was so popular during this period.

KEY VOCABULARY

apex (p. 40) the top or highest point of something

epic (p. 41) very great or large and usually difficult or impressive

PREPARE TO READ

Ask students if they've ever been to a roller derby bout. If possible, show photos of a roller derby. Explain that it is a contact sport—players come into bodily contact with each other. Invite volunteers to name other contact sports. Then challenge students to think of a contact sport on wheels.

CLOSE READING AND TEXT ANALYSIS

Key Ideas

- Create a timeline showing important events in the history of roller derby. Refer to the text to fill in your timeline. *CCSS Reading 3*
- What forces act upon the roller derby players? How do the forces determine the motion of the players? Cite text details to support your answers. *CCSS Reading 2*

Craft and Structure

- Make Inferences** How could technology improve the sport of roller derby? Brainstorm ideas with a group of classmates and generate a list of possibilities. *CCSS Reading 1*
- Summarize Details** Work with a partner to make a list of the rules of roller derby. Create pictures and diagrams as necessary to help explain the rules. *CCSS Reading 2*

WRITING

Write a Persuasive Letter Should roller derby become an Olympic sport? Write a letter to the International Olympic Committee to express your opinion. Include information about the current Olympic Charter rules that prevent roller derby from qualifying. Explain why you think these rules are fair or unfair.



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).

- In “Battle of the Bionics,” the Cybathlon is described as a merger of human effort and technological innovation. Look through other articles to find more examples of human effort and technology working together. Write a short essay to describe what you find.
- What motivates athletes to compete? Use information from “Lighting It Up,” “Battle of the Bionics,” and “Fighting Back” to find out. Sort the information you find into categories. Then write a paragraph that summarizes what you discovered.
- Refer to “Battle of the Bionics,” “Baseball by the Numbers,” and “Fighting Back” to find information on ways that future Olympic competitions may change. Write a brief paragraph to explain the changes.
- Roller derby is still a low-tech sport, but this might change. How could the technological innovations used in other sports and competitions be applied to roller derby? Refer to the magazine articles to help you write a list of ideas.
- Create a two-column chart with the headings “Math” and “Science.” Then skim the articles to find examples of how sports and competitions are influenced, changed, or improved using math and science.





EXPLORATORY LEARNING - FLEXIBLE MINI-UNIT DESIGN

ENGAGE

READ FOR A
PURPOSE

APPLY

ENGAGE: Engage students in the topic of sports and technology by focusing on the Essential Question: How does technology change the way people play and observe games? Ask students to find photos, diagrams, and details from the articles that convey information about how technology has contributed to different sports and competitions. Then guide students in completing a chart like the one below.

Sport/Competition	Contributions by Technology
Basketball	High-tech training floor
Cyathlon	Powered prosthetics, computer-controlled exoskeletons, Brain Computer Interface
Football	





READ FOR A PURPOSE

INTRODUCE THE ACTIVITY: PROBLEM-SOLVING PROTOTYPE Explain to students that in this activity, they will work in groups to come up with ideas for using the technological advancements described in the magazine to solve a problem in their school. Continue by explaining that this problem could involve athletics, academics, buildings, socializing—anything! Tell students they will:

- Read their group's assigned article for information about technology.
- Work with their group to brainstorm problems at school that could be improved using the technology described in the article.
- Choose one problem to solve.
- Develop and design the solution.
- Draw a prototype, or model, of the solution and present it.

At this time, you should divide the class into four groups.

RETURN TO THE TEXT: Explain to students that before they can design their prototype, they must gather information from their assigned articles. Tell groups to think of their article as a toolkit and explain that they can use any innovation described in the article to help them solve their problem. Assign one of the articles below to each group.

Group 1: "Battle of the Bionics"

Group 2: "Real Sports, Virtual Reality"

Group 3: "Lighting It Up"

Group 4: "Baseball by the Numbers"

Distribute a copy of the Technology Toolkit graphic organizer (p. 14) to each student. Have group members work together to list the technological innovations mentioned in the article. Explain that some articles contain more innovations than others, but all groups should be able to come up with creative solutions.





APPLY: PROBLEM-SOLVING PROTOTYPE: Now that groups have gathered information from their assigned articles, they are ready to brainstorm problems and solutions.

Materials: paper, pencils, colored pencils and markers, completed Technology Toolkit graphic organizers

STEP 1: Brainstorm Problems Have each group brainstorm a list of problems at school. Remind them that the problems need not be huge and can be related to just about anything. Also explain that all ideas should be considered with an open mind. Suggest groups elect one member to record ideas.

STEP 2: Choose a Problem Tell students to work together to choose one of the problems from the list they created as their focus. Explain that all members should agree on the problem. Distribute the Problem-Solving Prototype graphic organizer (p. 13) to students and tell them to write their problem in the space provided.

STEP 3: Brainstorm and Choose a Solution Have each group brainstorm ways they can use the technological innovations available to them to solve this problem. The recorder should write down all solutions mentioned. Then group members should choose a solution.

STEP 4: Design and Prototype Group members should work alone to design and prototype a solution by drawing it in the space provided on the Problem-Solving Prototype graphic organizer. Distribute pencils, markers and colored pencils. Tell students to make their drawings as accurate and clear as possible. Suggest they make a rough pencil sketch and then improve it.

STEP 5: Add Explanations Group members should work alone to complete the Problem-Solving Prototype graphic organizer. Then allow time for group members to review each other's work.

STEP 6: Present Groups can present their work to the class. One group member should be the presenter who explains the problem they came up with, the solution they developed and the article their technology came from.



NAME: _____

PROBLEM-SOLVING PROTOTYPE

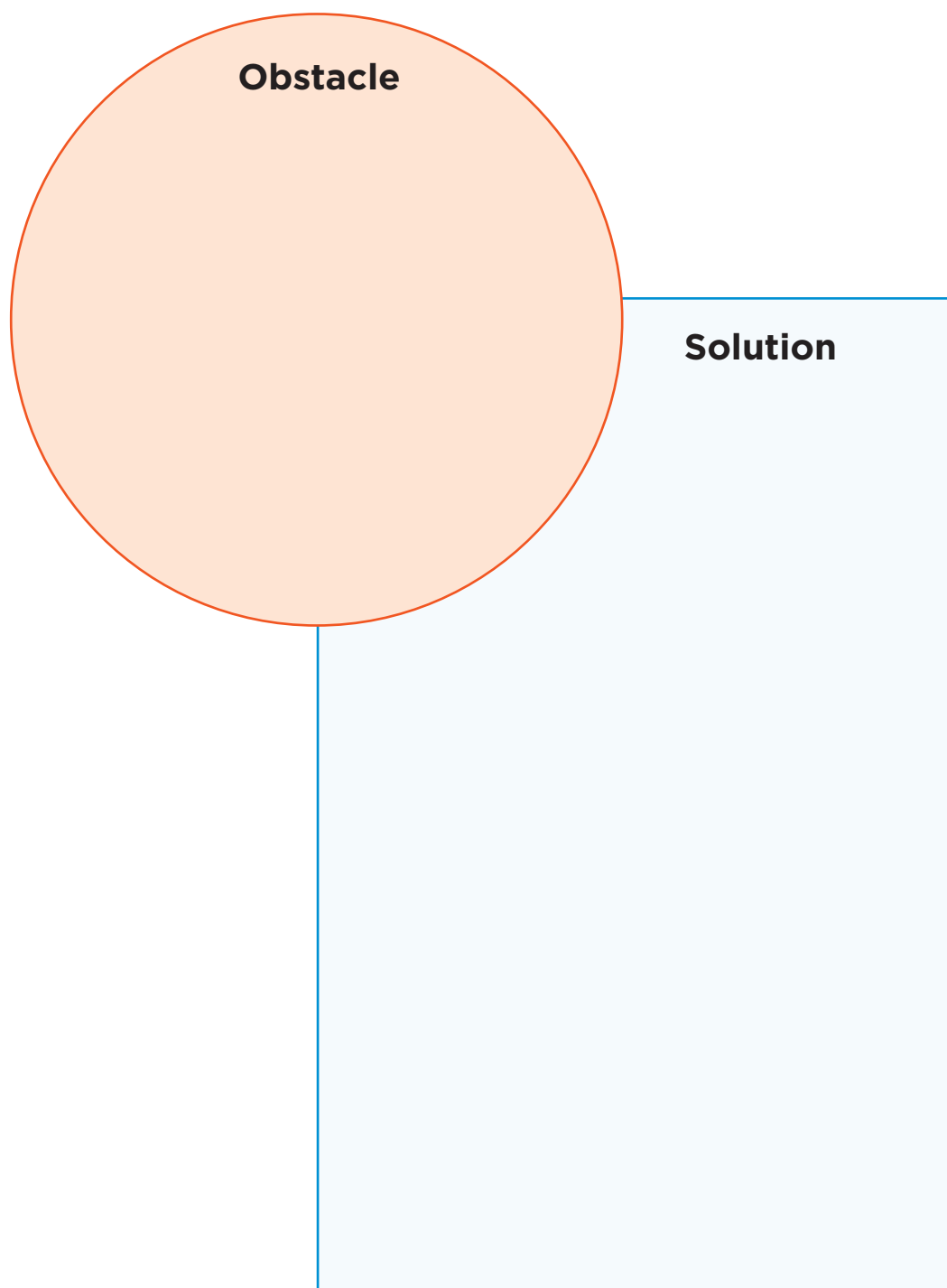
Problem we chose to solve _____

Technology used in solution _____

Explanation of solution _____

NAME: _____

TECHNOLOGY TOOLKIT





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

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 and sufficient evidence.	Writing 1	
Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately.	Writing 2	
Write narratives to develop real or imagined experiences or events.	Writing 3	
Draw evidence from literary or informational texts to support analysis, 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	PHYSICAL SCIENCE	EARTH SCIENCE	SPACE SYSTEMS
<ul style="list-style-type: none">• Structure and Function of Living Things• Life Cycles and Stages• Reproduction & Inherited Traits• Animals• Plants	<ul style="list-style-type: none">• Forces and Interactions• Energy• Light• Sound• Electricity/ Magnetism• Matter• Waves• Heat• Chemistry• Information Processing	<ul style="list-style-type: none">• Weather• Climate• Rocks & Soil• Erosion and Weathering• Landforms• Water• Oceans• History of Earth• Plate Tectonics• Volcanoes, Earthquakes, and Tsunamis	<ul style="list-style-type: none">• Solar System• Planets• Moon• Sun

