

# Teacher's Guide



## MAGAZINE ARTICLES

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April 2017**

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**OVERVIEW**

*In this magazine, readers will learn about different creatures—where they live, what they eat, and how they look and move. **Ladybug: April 2017***

*includes information about prairie dogs and burrowing owls, as well as ants, beetles, butterflies, crickets, and spiders.*

**ESSENTIAL QUESTION:**

***What can you learn about animals from words and pictures?***

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 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 can you learn about animals from words and pictures?

MAGAZINE ARTICLES	CORE CONTENT CONCEPT	LITERACY SKILLS	CORRESPONDING CCSS ANCHOR STANDARDS
<b>Max and Kate</b> Contemporary Realistic Fiction	Story characters have the same feelings that real people have.	<ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Interpret Visual Information</li> <li>• Analyze Word Choice</li> <li>• Retell a Story</li> </ul>	<i>Reading 1, 3, 4 &amp; 7</i> <i>Speaking &amp; Listening 1</i>
<b>Puff and Pip Search for Home</b> Fantasy	In fantasy stories, the characters may be animals that act like people.	<ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Analyze Text Structure</li> <li>• Identify Sensory Details</li> <li>• Act Out a Story</li> </ul>	<i>Reading 2, 3, 4 &amp; 5</i> <i>Speaking &amp; Listening 1</i>
<b>Nicholas and Mr. Pig</b> Contemporary Realistic Fiction	Authors have different reasons for writing. They might want to entertain you with a story, persuade you to think something, or give you information.	<ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Compare Texts</li> <li>• Identify Author's Purpose</li> <li>• Write Directions for an Experiment</li> </ul>	<i>Reading 3, 6 &amp; 9</i> <i>Writing 2</i>
<b>Can You?</b> Lyrical Poem	A question poem is made up of a list of questions. The questions might begin with the same word, but they don't have to.	<ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Identify Sound Devices</li> <li>• Analyze Word Choice</li> <li>• Write a Question Poem</li> </ul>	<i>Reading 1, 4 &amp; 5</i> <i>Writing 3</i>
<b>A Family of Ladybugs</b> Humorous Poem	Illustrations can help readers notice and understand details in the poems they read.	<ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Interpret Visual Information</li> <li>• Identify Sound Devices</li> <li>• Write a Personal Narrative</li> </ul>	<i>Reading 3, 4 &amp; 7</i> <i>Writing 3</i>

**Comparing Texts:** *Reading 9*

**Mini-Unit:** *Reading 1 & 7; Writing 2; Speaking & Listening 4*





Max, Kate, and Charlie have fun looking at ants in Kate's new ant farm.

## ESSENTIAL QUESTION

**What can you learn about animals from words and pictures?**

## CORE CONTENT CONCEPT

**English Language Arts** Story characters have the same feelings that real people have.

## CROSS-CURRICULAR EXTENSION

**Science** Find a close-up picture of an ant in a book or online. Learn about its body parts. Then draw your own ant picture. Label these parts of your ant: head, thorax, abdomen, antennae. Share your picture with the class.

## KEY VOCABULARY

**order (p. 4)** to request something from a company

**online (p. 4)** done over the internet

**spotted (p. 5)** saw or noticed something

## PREPARE TO READ

Ask students to share what they know about ants. Then display a real ant farm, if possible, or show a picture of one from the internet. Explain that an ant farm is used to study how ants behave. Tell students that in this story, Max, Kate, and Charlie learn about ants by studying their behavior in Kate's new ant farm.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- How does Kate surprise Max? Find words and pictures to support your answer. *CCSS Reading 3*
- What do you learn about ants on pages 6 and 7? Use information in the pictures to support your answer. *CCSS Reading 1*
- How does the magnifying glass help Max? Use information in the words and pictures to support your answer. *CCSS Reading 3*

### Craft and Structure

- **Interpret Visual Information** Look at the pictures on pages 5-6. What happened when Kate left her ant farm outside? What did the ants do when they got into the ant farm? Describe what happened. *CCSS Reading 7*
- **Analyze Word Choice** How can you tell that Kate, Max, and Charlie feel excited about the ant farm? Look for words and phrases in the story that show excitement. Would you be excited to have an ant farm? *CCSS Reading 4*

## SPEAKING AND LISTENING

**Retell a Story** Work with a partner to take turns retelling parts of the story. Use the pictures to help you. When it is your turn to retell, point to a picture and tell your partner about the story events it shows. When it is your partner's turn to retell, listen quietly and pay attention.



Lexile Score: 670



Pip, a prairie dog, and his friend Puff, a burrowing owl, live happily in their underground home. When a mule deer asks how they can live in such a dry, dusty place, Pip and Puff set out to find a better home.

## ESSENTIAL QUESTION

**What can you learn about animals from words and pictures?**

## CORE CONTENT CONCEPT

**English Language Arts** In fantasy stories, the characters may be animals that act like people.

## CROSS-CURRICULAR EXTENSION

**Science** Do prairie dogs and burrowing owls really live together? Look for information online and in books to answer this question. If they do live together, find out why they do this. Share what you learn with the class.

## KEY VOCABULARY

**burrow (p. 8)** a hole or tunnel in the ground that an animal makes to live in or for safety

**nestled (p. 8)** settled softly into something

**lush (p. 10)** covered with healthy green plants

**plains (p. 10)** large areas of flat land without trees

## PREPARE TO READ

Ask students to name creatures that live underground (ants, mice, moles, worms, chipmunks). Then ask why animals like to live underground. Explain that underground homes are safe and comfortable. Finally, tell students that this story is about animals that live in an underground home called a burrow.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- How are Puff and Pip like humans? How are they like animals? Use information from the story and pictures to support your answer. *CCSS Reading 3*
- What is wrong with the other homes Puff and Pip find? Find information in the story and pictures to support your answer. *CCSS Reading 3*
- What lesson do Puff and Pip learn? Support your answer with information from the story. *CCSS Reading 2*

### Craft and Structure

- **Analyze Text Structure** Who are the characters in this story? What happens at the beginning, middle, and end of the story? Write your answers in the Story Chart handout (p. 15). *CCSS Reading 5*
- **Identify Sensory Details** Words that help you imagine how things look, smell, feel, sound and taste in a story are called sensory details. Use the Sensory Details chart (p. 16) to record details from this story. *CCSS Reading 4*

## SPEAKING AND LISTENING

**Act Out a Story** Work with your classmates to act out this story. First decide who will play Puff, Pip, and the other characters. Then act out what happens at the burrow, the field, the sandy hill, and the watering hole. Practice your play and then perform it for another class.



Nicholas is getting ready to paint his play dough pig when he notices it has spots. He discovers the spots are ants and wonders why ants would be interested in his pig. With his mother's help, he conducts an experiment to find out.

## ESSENTIAL QUESTION

**What can you learn about animals from words and pictures?**

## CORE CONTENT CONCEPT

**English Language Arts** Authors have different reasons for writing. They might want to entertain you with a story, persuade you to believe something, or give you information.

## CROSS-CURRICULAR EXTENSION

**Art** Ask an adult to help you make a batch of homemade play dough (1 cup flour, 1/4 cup salt, 1/2 cup warm water, and food coloring). Use it to make an animal. After it has dried, paint it or color it with markers. Share your creation with classmates.

## KEY VOCABULARY

**jerked (p. 22)** moved something with a sharp, quick motion

**stethoscope (p. 23)** an instrument that is used for listening to someone's heart or lungs

**cluster (p. 27)** come together to form a group

**swarm (p. 27)** to move in a large group

## PREPARE TO READ

Read aloud the title and walk through the illustrations with students. Discuss what is happening in each picture. Then ask students to predict what they think will happen in the story. After reading the story, help students check their predictions.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- What does Nicholas want to know about the ants? Find information in the story and pictures to support your answer. *CCSS Reading 3*
- How does Nicholas act like an artist, a doctor, a detective and a scientist? Use information from the story to support your answer. *CCSS Reading 3*
- How does Nicholas find out why the ants were eating his pig? List the steps he takes in the story to solve the mystery. *CCSS Reading 3*

### Craft and Structure

- **Compare Texts** Read "What Do Ants Eat?" on page 28. Compare the article and the story. How are the pictures of ants similar and different? How is the information about ants similar and different? *CCSS Reading 9*
- **Identify Author's Purpose** Why did the author write this story? Does she want to entertain you, give you information, or make you believe what she is saying? How can you tell what her purpose is? *CCSS Reading 6*

## WRITING

**Write Directions for an Experiment** Write directions for the experiment Nicholas performs in the story. Use the Ant Experiment organizer (p. 17) to record your directions. Find information about the experiment in the story. First, make a list of the things you need for the experiment. Next, make a list of the steps you need to follow. Be sure to number your steps. Finally, add a title to your directions.



In this poem, children act like bugs by creeping, leaping, flitting, and sitting.

## ESSENTIAL QUESTION

**What can you learn about animals from words and pictures?**

## CORE CONTENT CONCEPT

**English Language Arts** A question poem is made up of a list of questions. The questions might begin with the same word, but they don't have to.

## CROSS-CURRICULAR EXTENSION

**Physical Education** Play animal charades with your friends. Choose one person to start the game by pantomiming an animal. Other players should try to guess the animal. Take turns imitating different animals.

## KEY VOCABULARY

**trekking (p. 29)** walking for a long distance

**seeking (p. 29)** searching for something

**flit (p. 29)** to move or fly quickly from one place or thing to another

## PREPARE TO READ

Have students stand up and apart from each other. Explain that when you say the name of a creature, you want them to silently pretend to be that creature. You might use butterfly, elephant, and rabbit for a variety of movements. Finally, explain that the next poem describes how bugs move.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- What are the children doing in this poem? Find information in the words and pictures to support your answer. *CCSS Reading 1*
- How do the children use their bodies to act like bugs? Support your answer with information from the words and pictures. *CCSS Reading 1*
- What are the bugs doing in this poem? Find information in the words and pictures to support your answer. *CCSS Reading 1*

### Craft and Structure

- **Identify Sound Devices** With a partner, take turns reading lines from the poem out loud. Listen for word pairs that rhyme. Make a list of these pairs. Then add one more word to rhyme with each pair. *CCSS Reading 5*
- **Analyze Word Choice** Find the word in each question that describes how the bug moves. Write the words you find. Then work with a partner to think of other words you know that have the same meanings. *CCSS Reading 4*

## WRITING

**Write a Question Poem** Write your own question poem. You can write questions that you have always wanted to ask. You can write questions that you think your pet or another animal might want to ask. You can begin with the same word or use all the question starters: who, what, when, where, why, and how. Try to write at least five questions. Share your poem with the class.



# ARTICLE: A Family of Ladybugs

Magazine pages 30 - 31, Humorous Poem



Read this poem about a family of ladybugs looking for a place to get out of the rain.

## ESSENTIAL QUESTION

**What can you learn about animals from words and pictures?**

## CORE CONTENT CONCEPT

**English Language Arts** Illustrations can help readers notice and understand details in the poems they read.

## CROSS-CURRICULAR EXTENSION

**Language Arts** Look in the library for these and other books about ladybugs:

*The Grouchy Ladybug* by Eric Carle  
*Are You a Ladybug?* by Judy Allen  
*Ladybugs* by Gail Gibbons

## KEY VOCABULARY

**shelter (p. 31)** a structure that covers or protects people or things

## PREPARE TO READ

Read the title aloud and preview the illustrations with students. Ask students to predict what the poem will be about. Record predictions on the board and then read the poem. After reading, discuss predictions.

## CLOSE READING AND TEXT ANALYSIS

### Key Ideas

- Where does the poem take place? Use information from the poem and the pictures to describe the setting. *CCSS Reading 3*
- How do the ladybugs protect themselves from the rain? Find information in the poem and the pictures to support your answer. *CCSS Reading 3*
- How does the ladybug family show kindness to the ant family? Support your answer with information from the poem and the pictures. *CCSS Reading 3*

### Craft and Structure

- **Interpret Visual Information** How do the ladybugs and ants act like humans? Work with a partner to list the different things you notice. *CCSS Reading 7*
- **Identify Sound Devices** Which words in this poem have the same ending sound? Write down the words that rhyme. Then look for words that the poet repeats in this poem. *CCSS Reading 4*

## WRITING

**Write a Personal Narrative** In “A Family of Ladybugs,” the ladybug family shares its raindrop shelter with a family of ants. Why is it important to share? Describe a time when you shared something or someone shared something with you. How did it make you feel? Write sentences to answer these questions.

## 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*).

- “Max and Kate” and “Nicholas and Mr. Pig” are stories about ants. What do you learn about ants in each story? Draw a T-chart. Write “Max and Kate” and “Nicholas and Mr. Pig” at the top of the chart. Write what you learn about ants in the columns of the chart.
- “Can You?” and “A Family of Ladybugs” are both poems. How are they similar? How are they different? Think about the way they look and the way they sound. Write your ideas in a Venn diagram (p. 18).
- This magazine is full of surprises. Who is surprised in “Max and Kate”? Who is surprised in “Puff and Pip” and “Nicholas and Mr. Pig”? How are these characters surprised? For each story, write sentences to tell about the surprise.
- Which creatures in this magazine live underground? Make a list of all the animals you read about that live underground.
- Which animals in the magazine act like people? Which animals in the magazine act like animals? Make a two-column chart. Label the columns “Animals That Act Like People” and “Animals That Act Like Animals.” Work with a partner to think about the different animals. Write your answers in your chart.

## EXPLORATORY LEARNING - FLEXIBLE MINI-UNIT DESIGN

This mini-unit offers students the opportunity for an in-depth look at the different creatures they read about in the magazine. First, students will describe animals, both in and out of the magazine. Then they will collect facts about one animal from the magazine and use them to create a Creature Card, or short report. Finally, students will present their reports to the class.

ENGAGE

READ FOR A  
PURPOSE

APPLY

**ENGAGE** Engage students in the topic of animals by first reviewing the Essential Question: What can you learn about animals from words and pictures? Then display a chart like the one below. Ask students to identify animals from the magazine and describe something they learned about them. Then encourage students to name other familiar animals and describe something about them. Add all information to the chart.

Animals	Something I learned or know
ants	Different kinds of ants like different kinds of food.





## READ FOR A PURPOSE

**INTRODUCE THE ACTIVITY: Creature Cards** Tell students that in this activity, they will be creating information cards about animals from the magazine stories. Explain that they will choose one animal, write facts about it, and draw a picture of it.

List the magazine animals on the board. Assign animals or have students choose from the list.

- ant
- prairie dog
- burrowing owl
- mule deer
- sandhill beetle
- beetle
- cricket
- butterfly
- spider
- ladybug

**RETURN TO THE TEXT:** Explain to students that before they can create their Creature Cards, they need to find some facts from the magazine texts. Explain that a fact is something that can be proven to be true. Continue by explaining that no one can disagree with a fact because it is always true. Write these two sentences on the board: *Grasshoppers can jump.* *Grasshoppers are the best bugs.* Ask which sentence gives a fact.

Next, tell students that they can find facts in the words and pictures of the magazine. Show students the picture of the mule deer on page 9 of the magazine. Ask them to state a fact about the mule deer's body (*A mule deer has antlers*). Then read aloud the first sentence on this page. Ask students to state a fact about what a mule deer eats (*A mule deer eats prairie grass*). Discuss some other things students can learn from pictures (body parts like antennae and wings; body coverings like fur or feathers; and colors or patterns, like spots).

Distribute one copy of the Fact Finder chart (p. 13) to each student. Have students use the magazine articles to find three facts about their chosen animals and write the facts in the chart. Circulate as students read and write to provide guidance as necessary.





**APPLY: CREATURE CARDS** Now that students have found facts about animals, they are ready to begin making their creature cards. Students should work independently to copy facts neatly and then draw pictures of their animals.

**STEP 1: Build Background**

Distribute one copy of the Creature Card frame to each student and go over the different sections.

Help students understand that they will be copying the facts they found onto their Creature Cards.

**MATERIALS**

- completed Fact Finder charts (p. 13)
- Creature Card frame (p. 14), one per student
- pencils
- colored pencils, markers, crayons

**STEP 2: Write**

Have students write the name of their animal on the card. Then have them copy their facts in the appropriate area of their Creature Card. Remind students to use neat, careful handwriting.

**STEP 3: Draw**

Distribute drawing materials and have students draw the animals in the appropriate area of their Creature Cards. Remind students to make their drawings as detailed as possible.

**STEP 4: Proofread**

Display the list below and have students use it to proofread their writing.

1. I wrote my animal's name.
2. I wrote three facts about my animal.
3. My handwriting is clear.
4. My sentences begin with a capital letter.
5. My sentences end with a punctuation mark.

**STEP 5: Share**

Have students take turns reading their Creature Cards aloud and sharing their drawings. Then display the cards in the classroom or assemble a class book titled "Animal Facts" and allow students to read it during free time.







## FACT FINDER

The name of my animal is \_\_\_\_\_

\_\_\_\_\_

<b>Fact 1</b>	
<b>Fact 2</b>	
<b>Fact 3</b>	



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

## CREATURE CARD FRAME

The name of my animal is \_\_\_\_\_  
\_\_\_\_\_

My Facts		

My Picture



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

## STORY CHART

Characters		Setting	
Beginning	Middle	End	



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

## SENSORY DETAILS CHART

How things feel			
How things taste			
How things smell			
How things sound			
How things look			



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

## ANT EXPERIMENT PLANNER

### Directions

Title \_\_\_\_\_

### What You Need

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### What You Need

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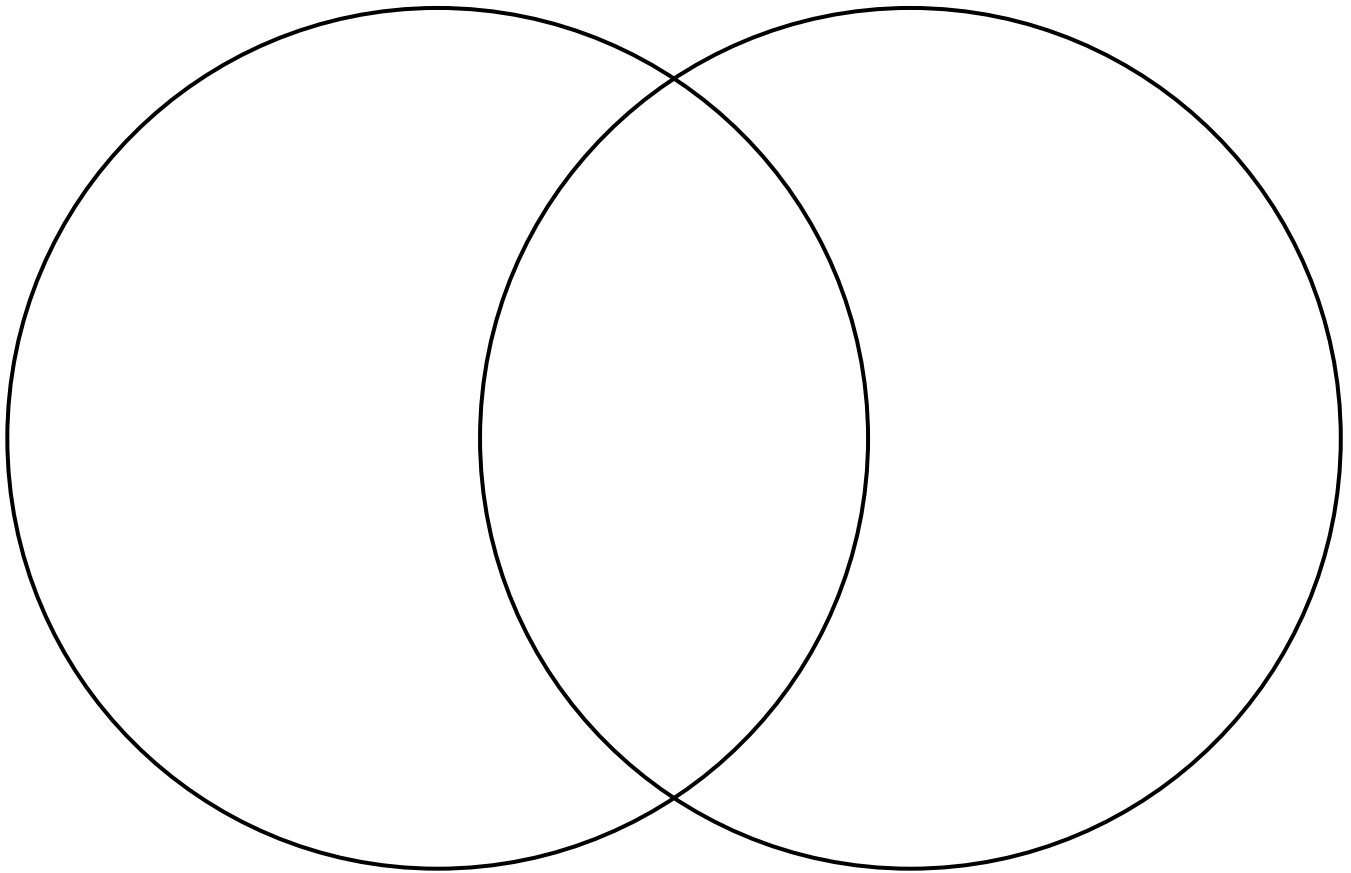
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NAME: \_\_\_\_\_

## VENN DIAGRAM





## 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 <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

- Structure and Function of Living Things
- Life Cycles and Stages
- Reproduction & Inherited Traits
- Animals
- Plants

### PHYSICAL SCIENCE

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

### EARTH SCIENCE

- Weather
- Climate
- Rocks & Soil
- Erosion and Weathering
- Landforms
- Water
- Oceans
- History of Earth
- Plate Tectonics
- Volcanoes, Earthquakes, and Tsunamis

### SPACE SYSTEMS

- Solar System
- Planets
- Moon
- Sun

