CCD Foundational Skills

COMMON CORE SCIENCE 2016

Lesson Schedule & Plans

Common Core Basics

Common Core Exercise

2016 SCIENCE CALENDAR

JANUARY	*Writing Emphasis - Apostrophes	
	Day One	Day Two
Week of 01.04 - 01.08		
Week of 01.11 - 01.15		
Week of 01.18 - 01.22		
Week of 01.25 - 01.29	**1.1 SKELETAL AND MUSCULAR SYSTEMS**	

FEBRUARY	*Writing Emphasis - Apostrophes	
	Day One	Day Two
Week of 02.01 - 02.05	**1.1 SKELETAL AND MUSCULAR SYSTEMS**	
Week of 02.08 - 02.12	**1.2 DIGESTIVE, RESPIRATORY, EXCRETORY, AND CIRCULATORY SYSTEMS**	
Week of 02.15 - 02.19	**1.3 NERVOUS, ENDOCRINE, AND REPRODUCTIVE SYSTEM**	
Week of 02.22 - 02.26	**1.4 HEALTH AND DISEASE**	
Week of 02.29 - 03.04	**CHAPTER 1 REVIEW AND CHECK YOUR UNDERSTANDING**	
	CHAPTER 1 APPLICATION OF SCIENCE PRACTICE	

MARCH	*Writing Emphasis - Subject / Verb Agreement	
	Day One	Day Two
Week of 03.07 - 03.11	**2.1 FLOWERING PLANTS**	
Week of 03.14 - 03.18	**2.2 RESPIRATION**	
Week of 03.21 - 03.25	***SPRING BREAK***	
Week of 03.28 - 04.01	**2.3 FERMINTATION**	
	CHAPTER 2 REVIEW AND CHECK YOUR UNDERSTANDING **CHAPTER 2 APPLICATION OF SCIENCE PRACTICE**	

APRIL	*Writing Emphasis - Modifiers	
	Day One	Day Two
Week of 04.04 - 04.08	**3.1 ECOSYSTEMS**	
Week of 04.11 - 04.15	**3.2 CARRYING CAPACITY**	
Week of 04.18 - 04.22	**3.3 SYMBIOSIS**	
Week of 04.25 - 04.29		

MAY	*Writing Emphasis - Clauses / Phrases	
	Day One	Day Two
Week of 05.02 - 05.06	**3.4 DISRUPTION**	
Week of 05.09 - 05.13	**3.5 ENVIRONMENTAL ISSUES**	
Week of 05.16 - 05.20	**CHAPTER 3 REVIEW AND CHECK YOUR UNDERSTANDING** **CHAPTER 3 APPLICATION OF SCIENCE PRACTICE**	
Week of 05.23 - 05.27		
Week of 05.30 - 06.03	***MEMORIAL BREAK***	

J U N E	**Writing Emphasis - Sentence Combining*	
	Day One	*Day Two*
Week of 06.06 - 06.10		
Week of 06.13 - 06.17		
Week of 06.20 - 06.24		
Week of 06.27 - 07.01		

J U L Y	**Writing Emphasis -*	
	Day One	*Day Two*
Week of 07.04 - 07.08		
Week of 07.11 - 07.15		
Week of 07.18 - 07.22		
Week of 07.25 - 07.29		

A U G U S T	**Writing Emphasis -*	
	Day One	*Day Two*
Week of 08.01 - 08.05		
Week of 08.08 - 08.12		
Week of 08.15 - 08.19		
Week of 08.22 - 08.26		
Week of 08.29 - 09.02		

S E P T E M B E R	*Writing Emphasis -	
	Day One	Day Two
Week of 09.05 - 09.09		
Week of 09.12 - 09.16		
Week of 09.19 - 09.23		
Week of 09.26 - 09.30		

O C T O B E R	*Writing Emphasis -	
	Day One	Day Two
Week of 10.03 - 10.07		
Week of 10.10 - 10.14		
Week of 10.17 - 10.21		
Week of 10.24 - 10.28		
Week of 10.31 - 11.04		

N O V E M B E R	*Writing Emphasis -	
	Day One	Day Two
Week of 11.07 - 11.11		
Week of 11.14 - 11.18		
Week of 11.21 - 11.25		
Week of 11.28 - 12.02		

D E C E M B E R	*Writing Emphasis -	
	Day One	Day Two
Week of 12.05 - 12.09		
Week of 12.12 - 12.16		
Week of 12.19 - 12.23		
Week of 12.26 - 12.30		

COMMON CORE BASICS

UNIT 1 LIFE SCIENCE

	PRE-TEST POST-TEST
Chapter 1: Human Body and Health	1.1 SKELETAL AND MUSCULAR SYSTEMS 1.2 DIGESTIVE, RESPIRATORY, EXCRETORY, AND CIRCULATORY SYSTEMS 1.3 NERVOUS, ENDOCRINE, AND REPRODUCTIVE SYSTEM 1.4 HEALTH AND DISEASE CHAPTER 1 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 1 APPLICATION OF SCIENCE PRACTICE
Chapter 2: Life Functions and Energy Intake	2.1 FLOWERING PLANTS 2.2 RESPIRATION 2.3 FERMINTATION CHAPTER 2 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 2 APPLICATION OF SCIENCE PRACTICE
Chapter 3: Ecosystems	3.1 ECOSYSTEMS 3.2 CARRYING CAPACITY 3.3 SYMBIOSIS 3.4 DISRUPTION 3.5 ENVIRONMENTAL ISSUES CHAPTER 3 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 3 APPLICATION OF SCIENCE PRACTICE

Chapter 4: Foundations of Life	4.1 THE CELL 4.2 SIMPLE ORGANISMS 4.3 INVERTEBRATES 4.4 VERTEBRATES CHAPTER 4 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 4 APPLICATION OF SCIENCE PRACTICE
Chapter 5: Heredity	5.1 GENETICS 5.2 GENOTYPES AND PHENOTYPES CHAPTER 5 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 5 APPLICATION OF SCIENCE PRACTICE
Chapter 6: Evolution	6.1 BIOLOGICAL EVOLUTION 6.2 COMMON ANCESTORY AND CLADOGRAMS 6.3 SPECIATION CHAPTER 6 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 6 APPLICATION OF SCIENCE PRACTICE
UNIT 2 PHYSICAL SCIENCE	
Chapter 7: Energy	7.1 ENERGY 7.2 WAVES 7.3 ELECTRICITY AND MAGNETISM 7.4 SOURCES OF ENERGY 7.5 ENDOTHERMIC AND EXOTHERMIC REACTIONS CHAPTER 7 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 7 APPLICATION OF SCIENCE PRACTICE
Chapter 8: Work, Motion, and Forces	8.1 NEWTON'S LAWS OF MOTION 8.2 FORCES AND MACHINES CHAPTER 8 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 8 APPLICATION OF SCIENCE PRACTICE

Chapter 9: Chemical Properties	9.1 MATTER 9.2 THE ATOM 9.3 COMPOUNDS AND MOLECULES 9.4 CHEMICAL REACTIONS AND SOLUTIONS 9.5 THE CHEISTRY OF LIFE EQUATIONS 9.6 CHEMICAL EQUATIONS CHAPTER 9 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 9 APPLICATION OF SCIENCE PRACTICE
UNIT 3 EARTH AND SPACE SCIENCE	
Chapter 10: Earth and Living Things	10.1 CYCLES OF MATTER 10.2 FOSSIL FUELS CHAPTER 10 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 10 APPLICATION OF SCIENCE PRACTICE
Chapter 11: Earth	11.1 GEOLOGY 11.2 OCEANOGRAPHY 11.3 METEOROLOGY CHAPTER 11 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 11 APPLICATION OF SCIENCE PRACTICE
Chapter 12: The Cosmos	12.1 EARTH'S ORIGINS 12.2 ORIGINS OF THE UNIVERSE 12.3 ORIGINS OF THE MILKY WAY AND THE SOLAR SYSTEM 12.4 EARTH AND THE MOON CHAPTER 12 REVIEW AND CHECK YOUR UNDERSTANDING CHAPTER 12 APPLICATION OF SCIENCE PRACTICE

Human Body and Health

1.1: Skeletal and Muscular Systems

MATERIALS

- o CCB Science pages 16 - 23

CCR STANDARDS

- o 4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
- o 5 Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

OBJECTIVES

- o Identify main parts of the human skeletal system
- o Classify different types of joints
- o Explain how the skeletal and muscular systems work together for movement

KEY CONCEPT

- o The human skeletal and muscular systems work together for support, protection, and movement.

VOCABULARY

Tier 2	o organization o voluntary
Tier 3	o cardiac muscle o ligaments o marrow o skeletal muscle o smooth muscle
Test Words	o

BEFORE LESSON

Determine students' readiness for learning about the skeletal and muscular systems by asking them to imagine themselves running or think of a marathon runner during a race. Encourage students to compare the job of the bones in the runner's legs to the job of the muscles. Ask how bones and muscles are alike and how they are different. Guide them toward a discussion of the purpose of each system.

BACKGROUND

Explain to students that bones and muscles work together to provide support and movement. Different kinds of muscles are specialized to do different tasks in different parts of the body. Some muscles are under conscious control, while others are not. Ask students who have broken a bone or damaged a muscle to describe how the injury affected their ability to move.

GUIDED PRACTICE

- o Set a Purpose for Reading
- o The Skeletal System
- o Joints
- o The Muscular System
- o Importance of Exercise

CORE SKILL

Understand Text Organization

Read the text with students. Then return to the text to ask students to describe the text's organization. Ask guiding questions such as: Why did the author begin the text by explaining the purpose of ligaments? Why is the text related to joints that can twist and glide presented before text related to joints that allow only a little or no movement? Does this text's organization communicate important ideas effectively? Would you make any changes if you were rewriting this text?

Determine Meaning

Read the text with students. Then ask volunteers to explain the relationship between voluntary and involuntary muscles and voluntary and involuntary nervous system responses. Ask students to explain the

EVIDENCE-BASED READING

Set a Purpose for Reading

- Draw a KWL chart on the board. Title the chart: The Skeletal System. Label the columns: What I Know; What I Want to Know; and What I Learned. Explain to students that a KWL chart is one of many effective tools they can use to make meaning of a text. Tell students that you're going to complete this chart together. Begin by inviting students to share what they know about the skeletal system. Record their responses in the chart. Then ask them to tell you what they want to know about the skeletal system. Again, record their answers in the chart. After reading the text, revisit the chart to complete the last column. If students don't find the answers to all of their questions, discuss what they could do to find the answers they seek.

21ST CENTURY SKILL

Communication and Innovation

- Invite students to discuss the value of precision in writing. Engage them in a discussion of the value of stating what's most important without cluttering a text with unrelated information. Also ask them how visuals, such as diagrams, can clarify text further. Then read the text together and emphasize points in the text that correspond to points students made during the discussion. Have them work in pairs or in small groups to complete the writing task. Ask students to share their work.

INTERACTIVE STRATEGY

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connection between involuntary responses and survival.

EXTENSION

Explain a Diagram

Gather students into small groups. Encourage them to examine the diagram of the arm on page 20 and use their own words to explain the role of muscle pairs in the raising and lowering of the forearm. Students may want to number the steps they describe, either orally or on paper, as they explain.

Construct a Model to Show How a Knee Flexes

Challenge students to research the parts of a knee, including bones, ligaments, cartilage, membranes, and bursa, or fluid-filled sacs. Have students examine how the parts work together to allow movement. Ask them to use the data they gather to build and explain a model of a knee in a flexed position.

LESSON REVIEW

WRITING TOPIC

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WRITING PRACTICE

o Remind students to think through the physical activity or exercise that they have selected before attempting to write. Help students decide which pattern of organization- order of importance, time order, or cause-and-effect order- is best suited for describing their chosen subject.

Human Body and Health

1.2: Digestive, Respiratory, Excretory, and Circulatory Systems

MATERIALS

- CCB Science pages 24 - 29

CCR STANDARDS

- 7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

OBJECTIVES

- Recognize the organs and processes of the digestive, excretory,
- circulatory, and respiratory systems
- Explain how these systems work together to provide the
- body's cells with energy and remove cellular wastes

KEY CONCEPT

- To carry out life activities, cells require food and oxygen. They also produce wastes. Each system plays a role in delivering the materials that cells need and carrying away wastes they make.

VOCABULARY

Tier 2	o
Tier 3	o excretory system o plasma o platelet o respiratory system
Test Words	o

EVEDENCE-BASED READING

Words as Context Clues

BEFORE LESSON

Determine students' readiness for learning about the digestive, respiratory, excretory, and circulatory systems by asking volunteers to name one organ from each system. Provide assistance, if necessary Ask students to brainstorm aloud about what they think the function of each organ is. Guide students to recognize that every organ plays a role in two vital tasks: providing cells with energy and removing cellular waste.

BACKGROUND

Tell students that the levels of organization in the body include cells, tissues, organs, and body systems. Just as every cell in the body is interdependent, so are the body systems. Communication and teamwork among these systems make it possible for the body to do jobs such as pumping blood and getting rid of wastes. Stress interdependence as students read.

GUIDED PRACTICE

- The Digestive System
- Integrate Text and Visuals
- The Excretory System
- The Circulatory System
- The Heart
- The Respiratory System

CORE SKILL

Determine Central Ideas

As a class, look for the central idea of the first paragraph of "The Excretory System." Encourage students to read this paragraph to find one or more words (such as remove, waste, or filters) that suggest the function of the excretory system.

Integrate Text and Visuals

Read the text with students. Encourage students to discuss how integrating text and visuals helps them make meaning of text and understand complex concepts or processes.

- Invite students to work with a partner to reread the text on this page. Model questions that students can ask themselves while reading, such as: What is this paragraph about? How is this paragraph organized? What are the important ideas? Do they form a pattern? After reading, have students underline words that serve as context clues. Point out that the words in, down, into, there, across carries, passes, and leave indicate location and movement from place to place. Students will notice that the text follows the sequence of food as it moves through the body. Help students recognize that the writer has placed ideas in the order that events happen. The text therefore follows a time-order pattern of organization.

21ST CENTURY SKILL

Information Literacy

- Have students read the text and then explain the meaning of the terms *reliable* and *reputable* in their own words. Invite students to give specific examples of how they can assess the reliability of a website and the articles found there. A reliable article should list an author, along with the author's credentials (information about their qualifications, degree, and employer). Remind students to look for the purpose of a website. For example, is the site selling a product? If so, information at the site might be biased.

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

EXTENSION

Practice Pronunciation

Select words or phrases that students might find difficult or that do not transfer well from their first languages. Model intonation and emphasize the stressed syllable in multisyllabic words. Have students repeat the words.

Investigate Body Systems

Have small groups of students work together to find additional details about a body system. They might research the system in more detail, identify diseases associated with the system, and determine the cause and effects of each disease. In their research, students should cite evidence regarding the cause of each disease and summarize possible treatments.

LESSON REVIEW

- Answers will vary, depending on which diagram the student selects. Remind students to use information from both the text and the diagram when writing their paragraphs.

Human Body and Health

1.3: Nervous, Endocrine, and Reproductive System

MATERIALS

- CCB Science pages 30 - 35

CCR STANDARDS

- 1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- 2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

OBJECTIVES

- Recognize the organs and processes of the nervous and endocrine systems
- Differentiate between male and female reproductive organs
- Sequence the events in the development of a fetus from a fertilized egg
- Identify conclusions and supporting details

KEY CONCEPT

- The nervous system and the endocrine system are responsible for communications within the body. They control many processes in the body, including those of the reproductive system.

VOCABULARY

Tier 2	o labor
Tier 3	o fetus o hormones o menstrual cycle
Test Words	o sequence

BEFORE LESSON

Determine students' readiness for learning about the nervous, endocrine, and reproductive systems by asking them to brainstorm a list of the various ways that messages can be delivered throughout an office building. Some messages might be delivered from person to person (via intercom, telephone, or e-mail), while other messages automatically occur in response to physical conditions in the building. Ask students to think about different kinds of conditions that can be "sensed" by a room in a building. Examples might include monitoring devices that turn off the room lights when no one is present, or thermostats that adjust the room temperature when it becomes too warm or too cold. Help students to distinguish between messages that are very quick (for example, a telephone call) and those that take longer (for example, a thermostat that eventually turns the heat on or off). Explain to students that these messaging systems are similar to the nervous and endocrine systems.

BACKGROUND

Hormones, produced by the endocrine system, are chemical messengers. They tell various organs what to do and when to do it. This is particularly true of the reproductive system, which relies on hormones to function. The brain, however, is the master organ that sends hormones to their targets. As the main organ of the nervous system, the brain coordinates all of the human body systems. Point out the connection between the brain and other organs as students read the lesson.

GUIDED PRACTICE

- The Nervous System
- Identify Conclusions
- The Brain
- The Endocrine System
- The Reproductive System
- Growth of the Fetus

CORE SKILL

Determine Central Ideas

Invite students to work with you to identify the key words and statements

EVIDENCE-BASED READING

Word Parts

- Write the words *cerebrum* and *cerebellum* on the board. Invite students *to* point out the portion of each word that is shared by both words, and then circle the word part *"cere".* Explain to students that the word *cerebrum* comes from the Latin word for brain. The word *cerebellum* is the Latin diminutive for *cerebrum,* meaning "little brain." Explain to students that a diminutive is a word form that indicates smallness. Explain to students that it is possible to understand the meaning of many words if they know the meanings of the word parts. Ask students to look up the meaning of the word *cerebral* in a dictionary.

21ST CENTURY SKILL

Communication and Collaboration

- Have students read the text and then write a paragraph describing a successful collaboration. Invite students to share specific examples of their experiences. Ask students to offer opinions on why collaboration might be particularly helpful in the workplace.

INTERACTIVE STRATEGY

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WRITING TOPIC

- During What Period is the embryo very sensitive?
- During what period is good nutrition especially important?
- What's the relationship between the endocrine system and the reproductive system

Include: A Restatement of the question, A quotation supporting answer, An explanation of your answer

that help readers understand the central ideas in this passage about the brain. After students have finished the central idea/supporting details graphic organizer in their notebooks, draw a blank version of this graphic organizer on the board. Encourage student volunteers to fill in their ideas regarding the central idea and the supporting details.

Cite Textual Evidence

Help students look for the words and phrases (such as: as soon as, begin, begins, during, and at the end of) that are cues identifying actions occurring in sequence. Invite students to point out the portions of the passage that state the development periods when the embryo is very sensitive and when good nutrition is especially important.

EXTENSION

Elaborate

Discuss words associated with the reproductive system that students might not know, such as fertilization, nutrition, and contraction. Help students understand some details about each word, such as how each uses the suffix -ion, which refers to the act, result, or state of something.

Draw Conclusions about Hormones

Challenge students to find out more about hormones. Ask them to research how hormones were discovered, and to summarize the names, sites of origin, and functions of some major hormones of the body. Encourage students to share what they learn in a class presentation.

LESSON REVIEW

WRITING PRACTICE

- Remind students that a *claim* is a statement or conclusion that is based on evidence and knowledge. Help students identify supporting details in the text.

Human Body and Health

1.4: Health and Disease

MATERIALS

- CCB Science pages 36 - 45

CCR STANDARDS

- 1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- 9 Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

OBJECTIVES

- Identify common diseases and their causes
- Discuss the types of nutrients used by the body
- Relate different types of drugs to their effects on the body

KEY CONCEPT

- To promote wellness and avoid common diseases, it is important to maintain a well-balanced diet and avoid any substances that change the normal functioning of the body.

VOCABULARY

Tier 2	o Drug o well-balanced diet o calorie o immunity o prescription o symptom
Tier 3	o antibiotic o over-the-counter

BEFORE LESSON

Determine students' readiness for learning about health and disease by asking them to briefly describe health-related stories that they have recently seen in the media. Ask students what stories have been the most interesting to them and which ones have been most relevant to their life or to the lives of their family members. Tell students that the public must be skeptical when hearing popular health-related news, and remind them that they must use their critical thinking skills before accepting every news story at face value.

BACKGROUND

Ask a student volunteer to read the two paragraphs following the Key Concept. Ask students to describe the ways in which the roles played by gasoline (in a car) and food (in the body) are similar. Introduce the term wellness and ask students how many of them have heard this term. Point out that the current emphasis on maintaining wellness places a greater emphasis on one's personal responsibility to choose actions that will maintain one's health, just as a car's owner takes responsibility for maintaining his or her automobile.

GUIDED PRACTICE

- Health and Disease
- Compare Multimedia Sources
- Workplace Connection
- Nutrition and Diet
- A Balanced Diet
- Drugs
- Inventing New Drugs

CORE SKILL

Evaluate Conclusions

Have students read aloud the first two paragraphs. Ask students to point out the factors in each paragraph that are known to increase the risk of heart and blood vessel disease. Remind students that clinical evidence supports the conclusions about the dangers of these factors.

Compare and Contrast Multimedia Sources

Test Words | o acquire

EVIDENCE-BASED READING

Clarify Meaning

o Tell students that charts and tables hold information in an organized way and help to clarify the meaning of the text. Have students look at the chart at the top of page 37. Tell students to look at the heading of each row and column to determine the content of the chart, and explain how to locate information on the chart using the headings.

21ST CENTURY SKILL

Flexibility and Adaptability

o Before reading the text, direct students' attention to the My Plate.gov diagram. Explain that an online image search will lead you to earlier nutritional models promoted by the USDA. Choose one or more of these models to share with students, and ask them to explain why such models change. Help students understand that such changes reflect flexibility and adaptability in scientific thinking. As technologies change and scientists have access to more information, they revise existing models.

INTERACTIVE STRATEGY

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WRITING TOPIC

Note Taking

o Disease / Condition
o What is it?
o Symptoms
o Cause / Effects
o Treatment

WRITING PRACTICE

Have students look for a media item aimed at children and ask them to analyze and evaluate its educational effectiveness. Ask them to identify who created the item and describe its purpose. Challenge students to describe how a story written by a company selling health-related products might differ from a story in a newspaper.

EXTENSION

Extend Language

Discuss and define additional common words associated with health and disease with which students might not be familiar. Ask students to identify words from the lesson that are unfamiliar and help them to understand their definitions.

Collect and Display Nutrition

Information Invite students to collect and display nutrient labels from a variety of snack-food packages. Ask students to create posters classifying the foods as high or low in food value and to assess the overall nutrient content of each food. When finished, encourage students to share their completed posters with the class.

LESSON REVIEW

- Remind students to write down their notes about the main idea and the supporting details before attempting to write their summary.

Life Functions and Energy Intake

2.1: Flowering Plants

MATERIALS

- CCB Science pages 54 - 61

CCR STANDARDS

- 7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

OBJECTIVES

- Identify the basic parts of a flowering plant
- Understand the food-making process in a plant
- Describe how flowering plants reproduce

KEY CONCEPT

- Flowers contain male and female reproductive structures and attract pollinators that transfer reproductive materials.

VOCABULARY

Tier 2	o Precise o Reproduction o Visual
Tier 3	o Chlorophyll o Photosynthesis o Pistil o Pollination o Stamen
Test Words	o

EVIDENCE-BASED READING

Collaborative Reading

- Read aloud the section titled Reproduction in Flowering Plants. Read the first sentence, and then select a student to read next. The student reads a sentence and selects the next

BEFORE LESSON

Determine students' readiness for learning by discussing prior knowledge of flowers and flowering plants. As a class, make a list of various kinds of flowering plants along with brief descriptions. Point out that there is great variety in the appearance of flowers, including their shape and color.

BACKGROUND

Explain to students that just like humans, flowering plants contain specific reproductive structures for passing on their genetic material and producing offspring. Other (non-reproductive) structures are also important in helping the plant remain healthy and capable of reproducing. Pollination is the process by which plants transfer reproductive materials between one another. Lead a discussion exploring why certain flowers and plants might attract different kinds of pollinators.

GUIDED PRACTICE

- Flowering Plants
- Integrate Text and Visuals
- Photosynthesis
- Reproduction in Flowering Plants

CORE SKILL

Apply Scientific Models

Read the text with students and work with them to answer each question. Afterward, ask students why models are so useful in science. Then write the term computer model on the board. Explain that a computer model is a program that simulates an event, or in other words, shows how an event happens in the real world. For example, explain that in 2007, researchers at the University of Illinois used a computer model to simulate photosynthesis, a process too elaborate and microscopic to observe in nature. Invite students to discuss the kinds of computer models they have seen or would like to see to help them understand a natural process.

Integrate Text and Visuals

Review the illustration on this page with the class. Lead a discussion about how the illustration, along with its labels, helps in understanding the text on the page. Be sure to point out the use of labels in identifying

reader. Repeat until every student has had a chance to read aloud. Assist students as needed.

21ST CENTURY SKILL

- Ask students to review the diagrams in the lesson. Ask: What purpose does each of these diagrams have? Are they the same purpose? Help students see that different diagrams have different purposes, including describing, explaining, and giving examples. Then discuss how visual tools provide details that are critical to clear communication. Read the sidebar text with students. Invite them to work independently or in pairs to write about a topic of interest. Remind them to include critical details that help readers understand the topic. Also encourage them to provide a diagram or some other visual device to communicate content related to their topics. Encourage students to share their final work.

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

- Remind students to think through every part of their journey before attempting to write. Encourage students to use the best possible type of diagram to show their journey, such as a map or a flow chart. Afterward, ask students to compare their visuals with the visuals in the lesson. Explain that the visuals in the lesson provide levels of detail and accuracy sufficient to help readers understand important concepts. Ask: Does your visual have sufficient detail and accuracy to make it useful to

structures.

EXTENSION

Demonstrate with a 3-D Model

To help students understand the parts of a flower, bring a flower to class. Help students identify each part of the flower and create labels for each part.

Construct an Advertisement

Have students select a particular flower and market that flower to potential pollinators. Have them develop a brochure, poster, or video that advertises the flower's merits to its potential pollinators.

LESSON REVIEW

someone unfamiliar with your neighborhood? What could you do to make it more useful?

Life Functions and Energy Intake

2.2: Respiration

MATERIALS

- CCB Science pages 62 - 69

CCR STANDARDS

- 3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
- 4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

OBJECTIVES

- Relate respiration to energy
- Identify step-by-step scientific procedures
- Describe the role of oxygen in the process of respiration
- Explain the process of cellular respiration

KEY CONCEPT

- When you breathe, you respire, or bring oxygen into your body. This process is called respiration. There's another kind of respiration, too. Within your cells, microscopic structures use the oxygen that you respire to release the energy locked in food molecules.

VOCABULARY

Tier 2	o aerobic o initiative o procedure o process
Tier 3	o cellular respiration o glycolysis o mitochondria

BEFORE LESSON

This lesson requires students to be familiar with the process of respiration in living organisms. Students learn that oxygen is required for cellular respiration, and carbon dioxide is given off as a waste product. Ask students to describe how their bodies responded to a period of heavy exercise or rigorous sport. Prompt students to explain how their activities affected their breathing rates. Explain that these experiences are connected to what they will learn about in this lesson.

BACKGROUND

Explain to students that respiration, or breathing, has two parts-inhalation and exhalation. Tell them that during inhalation, they breathe in oxygen, which leaves the lungs and enters the bloodstream, where it is delivered to the body's cells. The cells use it to break down sugar molecules to produce high-energy ATP molecules. The process releases carbon dioxide as a waste gas. Relate this process to students' descriptions of how their breathing changed during heavy exercise or sport. Invite a volunteer to draw a simple diagram on the board to represent the gas exchange that occurs during rest and during activity.

GUIDED PRACTICE

- The Need for Energy
- Mitochondria
- Inside the Cell
- Bioremediation

CORE SKILL

Determine Meaning of Terms

Read the explanation aloud and as a class use the word parts to define each term. Encourage students to construct and share sentences that use the words.

Follow a Multistep Procedure

Review the steps in the procedure for examining microorganisms in pond water. If possible, have students use tools and samples of pond water to complete the procedure. Discuss the value of writing numbered steps. Help students understand the value of writing explicit instructions for a

Test Words o

EVIDENCE-BASED READING

Word Parts

o Write the word carbohydrate on the board. Explain that the word comes from two word parts: carbo +hydrate. Also explain that the word part carbo comes from the chemical element carbon, and the word part hydro comes from the Greek word *hydor*, meaning "water." Remind students that the chemical structure of water is H20, or two hydrogen atoms bonded to one oxygen atom. Explain that all carbohydrates, from simple sugars to starches, are a combination of carbon, hydrogen, and oxygen atoms. Show or project models of the chemical structures of a variety of carbohydrates and invite students to identify the carbon, hydrogen, and oxygen atoms in each structure

21ST CENTURY SKILL

Initiative and Self-Direction

o Have students read the text and then explain initiative and self-direction in their own words. Invite students to give specific examples of personal initiative and explain that the result or effect of that initiative. Ask students to offer opinions on why such behaviors might be particularly helpful in the workplace.

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

scientific investigation. (Steps make the investigation reproducible, meaning results should be similar.)

EXTENSION

Explain a Diagram

Gather students into small groups. Encourage them to examine the close up of a mitochondrion in the diagram on page 64 and explain cellular respiration in their own words. Students may want to number the steps they describe, either orally or on paper, as they explain.

Interpret a Multistep Process

Organize students into small groups and provide drawing materials. Have students write the steps for a familiar process, such as repairing a bicycle or changing an automobile tire. Have students draw diagrams to support the directions in each step.

LESSON REVIEW

- Remind students to think through the process of the experiment before attempting to write. Then have them order and number the steps. If possible, have students compare their steps with a partner to determine if all necessary steps are included and ordered properly.

Life Functions and Energy Intake

2.3: Fermentation

MATERIALS

- CCB Science pages 70 - 77

CCR STANDARDS

- 3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
- 9 Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

OBJECTIVES

- Relate fermentation to energy
- Relate the absence of oxygen to fermentation
- Explain the process of fermentation

KEY CONCEPT

- Fermentation is a process that produces energy within a cell in the absence of oxygen.

VOCABULARY

Tier 2	o accountability o productivity o research
Tier 3	o anaerobic o fermentation
Test Words	o compare o contrast

EVIDENCE-BASED READING

Model Fluent Reading

- Remind students that each punctuation mark in a text serves a purpose. Review the first paragraph on page 70 as a class, asking students to identify the places where commas

BEFORE LESSON

In this lesson students will learn about the process of fermentation as a means of breaking the bonds of sugar molecules to harvest the energy of those bonds in the absence of oxygen. To determine their readiness for the lesson, invite students to discuss their experiences baking or observing the preparation of yeast breads, such as loaf bread, rolls, and doughnuts. Or bring in a loaf of bread, and ask students to observe the bread's texture. Ask students to predict what might cause the holes they see to form.

BACKGROUND

Explain to students that cellular fermentation is similar to cellular respiration, in that cells use the process to harvest the energy locked in the chemical bonds of sugar molecules. However, cellular respiration occurs in the presence of oxygen, so it is aerobic. Fermentation occurs in the absence of oxygen, so it is anaerobic. Ask students when they have heard or read the terms aerobic before. Prompt them, if necessary, to think of aerobic exercise, and that such exercise requires more oxygen intake. Then explain that the prefix *an-* means "without." Ask a volunteer to define the term anaerobic

GUIDED PRACTICE

- Fermentation
- Ethanol: An Alternative Energy Source

CORE SKILL

Apply Scientific Processes

Invite students to discuss professionals who conduct investigations, collect data, or information, and form hypotheses, or conclusions based on that data. Students may say, for example, that police officials conduct investigations to gather data and come to some conclusions about specific crimes. Companies hire chemists and engineers to collect data on new products to be sure they are safe for consumers. Help students understand that no matter the purpose of their work, these professionals follow similar procedures to be sure their conclusions are valid. Read the text in the Core Skill with students. Then organize students into small

appear. Ask students what those commas tell a reader to do. Then ask students to listen as you read the paragraph aloud, first reading while ignoring the commas and then reading while acknowledging the commas. Afterward, ask students to describe the differences in what they heard. Invite volunteers to read the paragraph again, modeling fluent reading.

21ST CENTURY SKILL

Productivity and Accountability

- Write the words productivity and accountability on the board or on a chart. Ask students to explain what they think each word means. Guide their responses to help them understand that productivity is the effective use of time and resources to produce a result, and accountability is personal responsibility for making something happen. Encourage students to give examples of times they have been both productive and accountable. Then have them read the text and explain how their behaviors are similar to the behaviors of scientists.

INTERACTIVE STRATEGY

-

WRITING TOPIC

-

WRITING PRACTICE

- Remind students to read carefully before beginning to write. Encourage them to think in terms of their own experiences as they write.

groups, and have each group draw and label the steps in the scientific process. Encourage students to share their work.

Compare and Contrast Information

After students have completed the investigation, ask them to use print, online, or other resources to find a similar experiment to observe the process of fermentation. Invite volunteers to describe similarities and differences between the investigation they conducted and the investigations they found. Ask students to consider the similarities and differences to offer suggestions for improving the investigation they conducted.

EXTENSION

Explain a Diagram

Gather students into small groups. Encourage them to recall the "Blow Up a Balloon" experiment. Ask students to use their own words to explain why the balloon inflated. Invite students to write simple sentences or draw illustrations to support their explanations.

Write an Explanation of a Process

Encourage students to learn more about yeast, a microscopic fungus that reproduces rapidly in certain conditions. Have them work in pairs, small groups, or independently to learn how yeast are manufactured for use in baking. Ask students to collaborate to write an explanation for how yeast work in the baking process.

LESSON REVIEW

Ecosystems

3.1: Ecosystems

MATERIALS

- CCB Science pages 88-95
- PowerPoint: Biomes and Ecosystems
- PowerPoint: Cycles on Ecosystems

CCR STANDARDS

- 4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
- 6 Assess how point of view or purpose shapes the content and style of a text.

OBJECTIVES

- Understand the organization of ecosystems
- Describe interactions between organisms
- Identify biomes of the world

KEY CONCEPT

- Within an ecosystem, organisms interact with one another and with nonliving things in their environment.

VOCABULARY

Tier 2	o Environment o Interact
Tier 3	o Biome o Biosphere o Ecosystem o Foods Chain
Test Words	o Prediction

EVIDENCE-BASED READING

-

BEFORE LESSON

Determine students' readiness for learning by discussing prior knowledge about how organisms interact with their environment. Remind students that the word organisms includes not only animals but also plants and even microorganisms. Ask students to start by thinking about the environment outside their school. Then have them consider environments that are very unlike the school environment. Lead a discussion with the class about how the nature of the environment affects the organisms that live in it.

BACKGROUND

Ask students to think of examples of ways they interact with their environment at home, at school, or at work. Remind students that they interact with other people, with furniture, with appliances and other machines, with the air they breathe, and with the water and food they ingest. Discuss cause-and-effect relationships among these interactions and what the consequences of removing items from these environments might be.

GUIDED PRACTICE

- Communities of Living Things
- Energy Cycles
- Biomes
- Protecting Biomes
- Ecology

CORE SKILL

Analyze Author's Purpose

Reviewing the way the text is structured can be helpful in analyzing an author's purpose. Have students review the information about biomes on this page and the next. Ask students whether they think the author had a purpose in organizing the biomes in the order shown. Have students provide the reasoning behind their answers.

Understand Text

Read the text as a class. Then ask students to think about the ecosystem models they created and the labels they used to identify organisms in their

21ST CENTURY SKILL

Social and Cross-Cultural Skills

- Write the words independently and collaboratively on the board. Ask students to explain what these words mean when they are applied to how people work. Invite students to give examples of times they have worked collaboratively to complete a project. Then read the text in the sidebar as a class. Ask students to consider the text and the examples they shared to answer the following questions: How do sharing your ideas and considering people's responses to those ideas challenge you to be more creative? How does sharing responsibility for completing a task increase a group's productivity?

INTERACTIVE STRATEGY

Biomes Map

- Have students predict where world Biomes located. Gather information from the text and label where biomes are located. Check student responses using PowerPoint.

WRITING PRACTICE

- Using Reference Sources to Understand Meaning
- Identify Stages of a Food Chain
- Have partners exchange their predictions about biomes and tell why the predictions did or did not match the text.

models. Ask students to explain the relationship between the labels in their models and jargon. Invite students to share other examples of texts they have read that contained jargon. Ask students to explain the value of identifying and interpreting jargon before they use a product.

EXTENSION

Using Reference Sources to Understand Meaning

Tell students that a thesaurus is a good reference source. Have them look up vocabulary terms they do not know to locate synonyms that are more familiar. Have them use those synonyms in meaningful sentences, and then replace those familiar terms with the lesson vocabulary term.

Identify Stages of a Food Chain

Have students select a particular biome, such as a desert. Have them create a diagram of a typical food chain within that biome. The food chain should include a producer, an herbivore, and a carnivore. Invite students to present their diagrams to the class in a creative way.

LESSON REVIEW

Ecosystems

3.2: Carrying Capacity

MATERIALS

- CCB Science pages

CCR STANDARDS

- 1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- 4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

OBJECTIVES

-

KEY CONCEPT

-

VOCABULARY

Tier 2	-
Tier 3	-
Test Words	-

EVIDENCE-BASED READING

Forms of a Word

- Write the word habitat on the board. Next to the word, write: from the Latin word “habitare”, meaning "it dwells or lives." Ask a volunteer to define the term as it is used in the lesson. Next, write the following words on the board: habit, habitable, habitual, habitation, inhabitant, and habilitate. Read the words aloud. Remind students of the

BEFORE LESSON

This lesson requires students to explain the concept of carrying capacity. To determine their readiness for the lesson, write the words serving size on the board, and ask students to describe where and when they have seen those words. Ask students to imagine that they have opened a package containing two serving sizes, but they must share the contents among four people. Have students explain some of the possible consequences of having fewer servings than are needed.

BACKGROUND

To understand the concept of carrying capacity, students need to fully grasp the concept of an ecosystem and of habitats of varying sizes within ecosystems. A habitat is the place where a population lives. An ecosystem is a collection of populations of different plants and animals that occupy and interact within a physical environment, either on land or water. The largest terrestrial ecosystems, or biomes, include different kinds of grasslands, deserts, forests, and alpine or mountain biomes. Ask students to identify the largest ecosystem in which they live. For example, the town or city in which students live may be on a prairie or in the foothills of a mountain ecosystem. Ask students to describe the physical environment and to name some of the organisms that live in the ecosystem.

GUIDED PRACTICE

- Carrying Capacity
- Relationships in a Habitat
- Reindeer on the Pribilof Islands
- Dietary Diversity

CORE SKILL

Cite Textual Evidence

Ask students to read the text and identify supporting evidence before discussing changes to the moose population as a class. Invite students to share their answers and the evidence they used to construct those answers. If students provide answers without citing evidence, have them skim the text again, and if necessary, revise their answers.

Understand Text

origins of the word habitat, and then ask them to use that meaning to define the terms you listed. Offer examples of sentences using the related words to guide student understanding. Ask students to explain how knowing a word's history can help them define related words.

21ST CENTURY SKILL

o

WORKPLACE CONNECTION

Wildlife Management

o Ask a volunteer to read the text aloud. Then ask students to explain the responsibilities of a wildlife manager. Remind students that some managers may mark and track wildlife movement in an ecosystem. Encourage students to discuss what managers can learn about animals by monitoring their movement.

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o Work with students to identify possible areas in the community where humans are putting pressure on environmental resources or species. Then select one of the areas and ask students to apply the concepts of limiting factors and carrying capacity to describe what might be happening there.

Before students do the activity, ask them to give examples of jargon associated with math, history, art, or any other area of study. Begin by providing a few common examples from a particular discipline, such as equation, variable, area, perimeter, and volume from mathematics. Then have students read the text before inviting them to describe what they would do first in an attempt to parse the text to define the jargon. Then have volunteers restate the text in their own words.

EXTENSION

Explain a Diagram

Encourage students to describe the diagram of the sea otter's dietary diversity in their own words. Explain any words in the diagram that are unfamiliar to students while drawing their attention to the pictures. Cover one or more of the foods in the diagram and ask students to explain the consequences of removing these organisms from sea otters' diets.

Sketch Your Plan

Provide graph paper and drawing materials. Have students use the paper and materials to develop the ideas they presented in Write to Learn. Ask students to draw the area they wrote about and show how organisms are affected by human activity. Encourage students to share and compare their work.

LESSON REVIEW

Ecosystems

3.3: Symbiosis

MATERIALS

- CCB Science pages

CCR STANDARDS

- 2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

OBJECTIVES

- Define symbiosis
- Describe mutualism, commensalism, and parasitism
- Give real-world examples of each type of symbiotic relation ship

KEY CONCEPT

- The term symbiosis describes specific kinds of relationships between organisms in the same environment.

VOCABULARY

Tier 2	o host o mutualism o parasite
Tier 3	o antibodies o symbiosis
Test Words	o summarize

EVIDENCE-BASED READING

Word Parts

- Write the word symbiosis on the board. Underline the base word bios. Explain that its history is Greek, and means "one's life, or way of living." Next, explain that letters attached to the beginning and end of a base word, or affixes, change the meaning of the word.

BEFORE LESSON

This lesson requires students to be familiar with biotic and abiotic factors in the environment. To determine their readiness, write the words living and nonliving on the board. Ask students to describe some of the living and nonliving things they see around them. Record their responses on the board. Then have students go beyond the classroom to consider spaces on the school campus. Continue adding students' examples to the lists on the board.

BACKGROUND

Explain to students that in any ecosystem, living things interact with each other and with the physical environment. These organisms are constantly competing for resources, such as food, water, and shelter. Organisms live symbiotically, or with other living things. The relationships that organisms share may benefit both, harm one organism, or help one while having no effect on another. Ask students to think of examples of familiar symbiotic relationships within a family, such as a parent and child or two siblings. Invite students to talk about how the two members of those relationships interact and help or benefit one another.

GUIDED PRACTICE

- Interactions Among Living Things
- Mutual Symbiosis
- Termites and Bacteria
- Acacia Trees and Ants
- Oxpeckers, Rhinos, and Zebras and Humans and E. coli
- Parasitic Symbiosis
- Commensal Symbiosis

CORE SKILL

Identify Hypotheses

Read the sidebar text aloud. Give students time to consider the scientists' observations of the acacia trees and form hypotheses. Invite students to share their ideas. Record their ideas on the board. (Acacia trees do not have a mutually beneficial relationship with the different kind of ant.)

Summarize Text

Letters attached to the beginning are called prefixes. Circle the prefix “symand” explain that it means "together." Explain that letters attached to the end of a word form a suffix. Circle the suffix -is. Explain that it most closely means "having the character of." Ask students to use their understanding of the word parts to define the term symbiosis.

21ST CENTURY SKILL

Critical Thinking and Problem Solving

- Invite volunteers to talk about the university website they researched. Have students identify their chosen universities and describe the kinds of science investigations that are being conducted there. Ask them to state the hypotheses university scientists are studying and the methods they're using. Encourage students to talk about the investigations that most intrigue them.

INTERACTIVE STRATEGY

-

WRITING TOPIC

-

WRITING PRACTICE

- Remind students to think through the different kinds of symbiosis before writing. Students should describe the interaction of the mother and the puppy before identifying the kind of symbiotic relationship the two share. Mothers and offspring have a parasitic relationship, as developing fetuses and newborns depend on the mother for resources, leaving fewer resources for the mother.

Remind students to think about what, why, and how as they reread their summaries. Tell them to be sure these three questions are addressed.

EXTENSION

Summarize and Illustrate

Organize students into small groups. Have students reread different sections of the text aloud ("Mutual Symbiosis," "Parasitic Symbiosis," and "Commensal Symbiosis") and explain what they have read in their own words. Have them select one section to label and illustrate.

Hypothesize and Propose an Experiment

Have students review the lesson and the organisms mentioned in it. Invite students to choose an organism, ask a question that can be answered through an investigation, form a hypothesis, and propose an experiment. You may want to ask students to write their hypotheses and proposals.

LESSON REVIEW

Ecosystems

3.4: Disruption

MATERIALS

- CCB Science pages

CCR STANDARDS

- 1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- 4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

OBJECTIVES

- Identify laws of ecology
- Give examples of environmental disruptions
- Explain the consequences of disruptions

KEY CONCEPT

- A disruption is a change that greatly alters an environment. Disruptions transform environments. In some cases, one ecosystem can temporarily or permanently replace another. In other cases, an ecosystem can become degraded, making it unfit for living things. Still other ecosystems are destroyed altogether.

VOCABULARY

Tier 2	o degradation o destruction o destruction o fragmentation o threatened

BEFORE LESSON

Determine students' readiness by engaging them in a discussion about what keeps an ecosystem healthy. Write different scenarios on note cards: mouse population in a field ecosystem grows too large; a wetland undergoes a dry period; a mountain ecosystem has too many predators; a desert ecosystem's cactus plants die off; and so on. Gather students into groups and give each group a note card. Ask students to read their scenarios and describe how equilibrium might be restored.

BACKGROUND

Remind students that an ecosystem includes both living and nonliving factors. Point out that in an ecosystem, organisms interact with one another and with their physical and chemical environment. Organisms depend on the stable functions of each other and the water, gases, and chemicals that cycle through the ecosystem. Invite volunteers to describe the living and nonliving elements of an ecosystem they have visited or would like to visit.

GUIDED PRACTICE

- The Laws of Ecology
- Responding to Change
- Fire and Floods as Disruptions
- Introduced Species as a Disruption
- Habitat Loss as a Disruptive Force

CORE SKILL

Determine Meaning

Ask students to think of their favorite sport or hobby. Encourage them to give examples of words that are unique to those activities, such as foot fault and stoppage time in soccer. Explain that most areas of interest and study have unique vocabulary associated with them. Read the text aloud and give students time to find and mark words on the first three pages of the lesson that use specialized words. Recall the word parts and meanings you have already studied to help define certain words. Remind students to mark other words as they continue reading.

Cite Textual Evidence

Tier 3	o abiotic o biodiversity o biotic o invasive species
Test Words	o

EVIDENCE-BASED READING

Repeated Reading

o Ask students to read aloud with you as you read "Introduced Species as a Disruption" (beginning on page 112) several times. Tell students to pay special attention to how the punctuation marks, introductory terms such as sometimes and however, and introductory phrases that signify time-order sequence all affect the way you read. Emphasize accuracy and phrasing until the group reading sounds smooth and consistent.

21ST CENTURY SKILL

Media Literacy

o Have students read the text and then share how they find reliable media sources. Ask students to give factors that indicate whether a website or resource is trustworthy. Invite students to explain why being media literate is important to their work and their roles as citizens.

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o Invite students to share their explanations for ways governments can use biodiversity

Give students time to read the text and complete the activity. Encourage students to share specific examples of text evidence that supports the IUCN's conclusion.

EXTENSION

Use a Graphic Organizer

Gather students into small groups. Ask students to reread Commoner's laws of ecology presented on page 110 and explain them in their own words. Have students make a four-column chart with a column for each law. Then have students draw or write an example of each law in the chart.

Collect and Display Data

Organize students into small groups. Have them use print and online media to find examples and non-examples of disruption as it relates to ecosystems. Have students organize their research into tables and encourage them to share their work.

LESSON REVIEW

measures to make decisions. Encourage students to discuss how the measures may or may not influence decision making.

Ecosystems

3.5: Environmental Issues

MATERIALS

- CCB Science pages

CCR STANDARDS

- 1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- 8 Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

OBJECTIVES

- Distinguish between nonrenewable and renewable resources
- Identify types of pollution
- Understand the effects of human activities on the environment

KEY CONCEPT

- Increased human population makes increased demands on Earth's resources and adds to pollution in the environment.

VOCABULARY

Tier 2	o climate o fact o speculation
Tier 3	o conservation o natural resources o pollution
Test Words	o

EVIDENCE-BASED READING

BEFORE LESSON

Draw a two-column chart titled Resources. Ask students to name resources they use regularly, such as water and gas. Place renewable resources in the left column and nonrenewable resources in the right. Do not tell the students which column is which. After the list is made, ask students to explain the difference between the two columns.

BACKGROUND

Discuss with the class recent news concerning pollution, the use of natural resources, and the environment. Encourage students to offer personal knowledge and experience with recycling, pollution, climate change, or other environmental issues. Return to the discussion, as appropriate, as you go through the lesson.

GUIDED PRACTICE

- Environmental Problems
- Pollution
- Uses of Land and Water and Endangered Species
- Global Climate Change

CORE SKILL

Distinguish Between Facts and Speculation

Tell students that when researching information about environmental problems, they must be very careful to distinguish between facts and speculation in the materials they find. When doing online research, students should rely mainly on websites that end in ".gov" or ".edu" to ensure they are reviewing research that can be relied on to be factual and objective.

Cite Textual Evidence

Have students compare their answers to the Core Skill activity on this page. Have students discuss the conservation methods that have helped the American bison and bald eagle recover. Have students work together to learn more about some of the other animals listed in this section.

EXTENSION

Practice Accuracy

Preview the Lesson

o Write the word preview on the board. Underline the base word view, and ask students to provide a synonym, or word with a similar meaning. Then circle the prefix pre-, and explain that when these letters appear before a base word, they mean "before." Ask students to explain what people do when they preview a text, such as a lesson in this book. Then organize students into pairs. Give students time to work with their partners to preview the lesson. Tell them that they are going to read titles, subtitles, boldfaced words, and visuals to find clues as to what the text is about. Afterward, give students time to share the clues they found. Explain that previewing a text before reading is an effective comprehension strategy they can apply with any text.

21ST CENTURY SKILL

Information, Communications, and Technology Literacy

o Have a class discussion to learn about the results of students' research on satellite technology. Discuss with students that while satellites give us the technology to study what is happening to polar ice caps and glaciers, it does not give us the means to change what is happening. Have students do further internet research to determine ways that scientists propose we can slow or stop polar ice melting.

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

Invite students to take turns closing their eyes and pointing to a word on a page. Have them read the word silently and then clap once for each syllable in the word, saying the word aloud at the same time. Help students understand that by recognizing syllables in words, they are better able to read word parts instead of individual letters, which leads to greater fluency.

Identify Research Questions

Have students work in pairs or small groups and ask them to select an environmental news story from the television, internet, radio, or a magazine that they can read together. As they read, have them identify and write down questions for further research. Have students compile their lists and select the points of research they will pursue. When their further research is completed, have them create a report that includes their own research.

LESSON REVIEW

WRITING PRACTICE

- Review with students that cause and effect relationships do not begin and end with one event but continue on, with the effect becoming the cause of another effect, and so on. Have students treat the effect from their original paragraph as the cause of the next event and write another paragraph following the same rules as before.

Foundations of Life

4.1: The Cell

MATERIALS

- CCB Science pages 132 - 175
- PowerPoint: Cell Structures

CCR STANDARDS

- 1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- 2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

OBJECTIVES

- Identify the basic structure of cells
- Identify similarities and differences in plant and animal cells
- Understand how cells work

KEY CONCEPT

- Cells are the basic units of structure and function in living things

VOCABULARY

Tier 2	o Function
Tier 3	o Cell o Diffusion o Nucleus
Test Words	o

EVIDENCE-BASED READING

o

21ST CENTURY SKILL

o

BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

The Structure of Cells

Cell Structures

Specialized Cell Structures

Specialized Cell Structures in Plants

How a Cell Works

Diffusion

Active Transport

CORE SKILL

Determine Conclusions

After students have read the text, have students work together in pairs. Have one student write a conclusion that answers the question **Why does a cell have specialized parts?** Ask the other student to point out the sentences in the text that serve as evidence supporting this conclusion.

Support Conclusions

Tell students that most of the time, in science writing, conclusions will be easy to determine and there will be plenty of supporting material included. This is because the practice of science requires that evidence be provided for hypotheses and other scientific statements. Ask students what might happen if scientists did not provide information that supports their conclusions when they share their findings with other scientists.

EXTENSION

Create and Label Drawings

Have students draw and label the plant cell and the animal cell shown on page 136. Then ask students to prepare a three-column table. Have students' list plant cell structures in the first column and animal cell structures in the second column. Remind students that many of these

INTERACTIVE STRATEGY

o Create and Label Drawings

WRITING TOPIC

o Write To Learn (Diffusion)

WRITING PRACTICE

o Determine Conclusions
o Use Reasoning, Planning, and Evidence

structures are found in both plant and animal cells. In the third column, ask students to use their own words to state the function of each structure.

Use Reasoning, Planning, and Evidence

Challenge students to research the use of intravenous saline solution to treat dehydration. Ask students to cite evidence supporting the use of IV saline solutions and challenge them to draw conclusions about why an intravenous saline solution is used instead of water.

LESSON REVIEW

Foundations of Life

4.2: Simple Organisms

MATERIALS

o CCB Science pages

CCR STANDARDS

o

OBJECTIVES

o

KEY CONCEPT

o

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

o

21ST CENTURY SKILL

o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Foundations of Life

4.3: Invertebrates

MATERIALS

o CCB Science pages

CCR STANDARDS

o

OBJECTIVES

o

KEY CONCEPT

o

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

o

21ST CENTURY SKILL

o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Foundations of Life

4.4: Vertebrates

MATERIALS

o CCB Science pages

CCR STANDARDS

o

OBJECTIVES

o

KEY CONCEPT

o

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

o

21ST CENTURY SKILL

o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Jason Kilpatrick

Heredity

5.1: Genetics

MATERIALS

- CCB Science pages 174 - 197
- Website Activity: An Inventory of My Traits
- Website Activity: Generations of Traits
- Website Activity: A Recipe For Traits
- Website Activity: Create a DNA Fingerprint
- PowerPoint:

CCR STANDARDS

- 1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- 2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

OBJECTIVES

- Relate genes to chromosomes
- Identify how traits are passed from parents to offspring
- Explain the structure and processes of DNA

KEY CONCEPT

- Genes carry the codes for human traits. They are located on chromosomes within the nucleus of every living cell.

VOCABULARY (WORD ANALYSIS)

Tier 2	o Dominant o Trait
Tier 3	o Chromosome o Genes o Genetics o Recessive

BEFORE LESSON

5.1: Genetics - An Inventory of My Traits

Create a Survey of classroom traits; Yes or No answers. During survey introduce vocabulary: Trait, Dominant, Recessive

Create a graph; Make a scientific statement using the data. Challenge the use of a Fraction, Decimal, and Percentage to explain results.

BACKGROUND

GUIDED PRACTICE

Genetics - Generations of Traits

During activity introduce vocabulary: Purebred, Hybrid, Chromosome, Gene, Variation

Gregor Mendel

Purebred and Hybrid

Genes and Alleles

Human Traits Chromosomes and DNA

The Genetic Code - A Recipe For Traits

CORE SKILL

Make Predictions

Tell students that a prediction involves using your thinking and experience to make a guess about what will happen next. Then have students complete the activity as they read about Mendel's pea plant research. Ask students whether their predictions were correct.

Summarize Text

Have students apply the skills they learned in "Summarize Accurately" on page 177 to summarize page 179. Tell students to self-edit their work, making sure it contains facts only and not their own ideas or opinions.

EXTENSION

Retell

Assign or have students choose a text excerpt from the lesson to retell in

Test Words | o Prediction

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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their own words. This is an opportunity to evaluate students' comprehension and ability to articulate information. Correct syntax as needed.

Design a Flow Chart to Show Critical Stages

Have students draw a flow chart that outlines Gregor Mendel's method for his landmark experiment on pea plants. Encourage students to use all the vocabulary words from this lesson in the flow chart.

LESSON REVIEW

Write to Learn

Before students begin to write, ask them to recall your discussion of using summarization as a comprehension strategy. Then explain that pausing occasionally to make predictions about what they are reading is another effective strategy. Help students understand that predictions are based on existing knowledge, so they must understand a text before they can make predictions related to the text. After students have completed the write

Heredity

5.2: Genotypes and Phenotypes

MATERIALS

o CCB Science pages

CCR STANDARDS

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OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Evolution

6.1: Evolution

MATERIALS

- CCB Mathematics pages 198 - 234

CCR STANDARDS

- 1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- 2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

OBJECTIVES

- Understand the theory of evolutionary development
- Recognize adaptions that enable organisms to survive in their environments
- Understand the importance of fossil evidence

KEY CONCEPT

- Fossils indicate that organisms have changed over time. The theory of evolution is scientists' best explanation for how those changes occur.

VOCABULARY (RELATE WORDS)

Tier 2	o Evidence
Tier 3	o Adaption o Evolution o Fossil o Mutation
Test Words	o

EVIDENCE-BASED READING

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BEFORE LESSON

6.1: Biological Evolution

6.2: Common Ancestry and Cladograms

6.3: Speciation

BACKGROUND

GUIDED PRACTICE

The History of Life

Darwin, Modified

Mutations

Fossils

Eras of Life on Earth

CORE SKILL

Identify Hypotheses

Draw a framework for a flow chart on the board, beginning with the word hypothesis and ending with the word theory. Invite students to read the sidebar and then underline the words and phrases in the sidebar that describe what takes place after a hypothesis is proposed. Ask students to fill in the flow chart, using the underlined words and phrases (careful experimentation, investigation, and extensive arid repeated testing) that occur before a hypothesis can be considered a theory.

Cite Textual Evidence

Review with students the first two paragraphs of the main text. Invite students to point out the sentences that supply specific evidence supporting the definition of fossil in the first sentence.

EXTENSION

Recognize Supporting Details

Explain that to recognize the main idea and supporting details, students should ask themselves questions: What is each sentence about? Is there one sentence that tells about the whole paragraph or that is more important than the others? Help students identify the main ideas and

21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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supporting details in sections in which students may need more support

Summarize Darwin's Journey

Assign students to research the journey of the HMS Beagle, the ship on which Charles Darwin sailed to study evolution. Invite students to plot Darwin's course on a map and summarize each point with a quote or discovery that Darwin made. Students could also illustrate the discoveries on the map. Then have them write a summarizing statement about the effect of the trip on Darwin's subsequent theory of evolution.

LESSON REVIEW

Write to Learn

When students have finished writing their paragraphs, invite one or more student volunteers to share their paragraphs with the class. If students are having trouble thinking of supporting details to add to their paragraphs, read aloud a magazine or a newspaper article covering a current event and point out the descriptive details used by the writer.

Evolution

6.2: Common Ancestry and Cladograms

MATERIALS

- CCB Mathematics pages 210 - 219
- Squiggles, Ziggles, and Zares
- NOVA Fish Sorting

CCR STANDARDS

-

OBJECTIVES

- Describe the purpose of cladistics
- Interpret a cladogram
- Identify assumptions behind cladistics

KEY CONCEPT

- Cladistics is an analytical method scientists use to hypothesize about the relationships among existing organisms. The foundation of the method is an agreement that members within any clade, or group, share a common evolutionary past.

VOCABULARY (RESPONSE)

Tier 2	o Ancestry o Assumptions o Diverge
Tier 3	o Cladistics o Cladogram o Homologous o Phylogeny o Systematics o Taxonomy
Test Words	o

EVIDENCE-BASED READING

-

BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

What is Cladistics?

The Main Ideas Behind Cladistics

How Do you Make a Cladogram?

Ingroups and Outgroups

The Principle of Parsimony

The Parts of a Cladogram

CORE SKILL

Determine Meaning

Read the first two paragraphs with students. Discuss the text to be sure students understand how to apply the meanings of word parts to define new words.

Integrate Explanations with Visual Representations

Read the text with students. Then ask them to examine the Venn diagram. Ask students to explain how the diagram helps them identify two features that the nambaroo and kangaroo share. Afterward, ask students to name other ways the information could be presented visually.

EXTENSION

Clarify Language

Ask students to revisit the cladogram on page 212 and explain its meaning in their own words. Ask students to tell you what illustrations they would use to help explain each label, and have them justify their decisions.

Formulate Research Questions

Have students review the sidebar on page 213, the text on page 217, and the Write to Learn box on page 217. Ask students to write research questions related to the topics presented in those sections. Encourage

21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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students to select one of their questions to research and answer. Have students present their answers in the form of written explanations supported by at least one visual.

LESSON REVIEW

Evolution

6.3: Speciation

MATERIALS

- CCB Mathematics pages 220 - 229
- Squiggles, Ziggles, and Zares
- NOVA Fish Sorting

CCR STANDARDS

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OBJECTIVES

- Identify different types and causes of speciation
- Describe different kinds of evolution

KEY CONCEPT

- Speciation refers to the evolutionary process by which new biological species form. The pressures of a different environment, the isolation of a population, or genetic changes that result in successful adaptations may lead to a species with characteristics unlike its ancestors.

VOCABULARY

Tier 2	o Fossil Record o Gene Flow o Hierarchy o Lineage
Tier 3	o Continental Drift o Incipient Species o Natural Selection o Speciation
Test Words	o

EVIDENCE-BASED READING

-

BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

Classifying Organisms

Lamarck and Darwin

Evolution and the Fossil Record

Continental Drift

Reproduction Isolation

Speciation

Allopatric Speciation

CORE SKILL

Determine Central Ideas

Read the opening paragraph aloud. Then invite volunteers to read each bulleted item aloud. Organize students into small groups and ask them to follow the bulleted steps as they reread the text on continental drift. Afterward, ask one person in each group to share their interpretation of the text's central idea. Discuss similarities and differences among groups' responses.

Analyze Text Structure

As a class, read all but the last paragraph in the text and review the clue words that signal particular types of text structure. Then read the last paragraph aloud, and give students time to search for examples of text structures in the parts of the lesson they have read and the parts that remain.

EXTENSION

Use Examples

Ask students to revisit the table on page 224. Ask students to explain how each kind of speciation process occurs by relying on specific examples

21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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presented in the text.

Predict Based on Models

Have students conduct research either independently or collaboratively into the geodynamic models that predict continental movement over the next several hundred million years. Ask students to draw and explain the changes that some scientists have predicted based on their models.

LESSON REVIEW

Make Connections

Organize students into pairs. Ask each pair to imagine that they are recording a conversation between Lamarck and Darwin about how the giraffe came to have such a long neck. Have students identify and connect points of view by writing a conversation in the form of a dialogue between the two scientists. Encourage pairs to perform their dialogues.

Energy

7.1: Energy

MATERIALS

o CCB Science pages

CCR STANDARDS

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OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Energy

7.2: Waves

MATERIALS

o CCB Science pages

CCR STANDARDS

o

OBJECTIVES

o

KEY CONCEPT

o

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Jason Kilpatrick

Energy

7.3: Electricity and Magnetism

MATERIALS

o CCB Science pages

CCR STANDARDS

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OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Energy

7.4: Sources of Energy

MATERIALS

o CCB Science pages

CCR STANDARDS

o

OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Energy

7.5: Endothermic and Exothermic Reactions

MATERIALS

o CCB Science pages

CCR STANDARDS

o

OBJECTIVES

o

KEY CONCEPT

o

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Work, Motions, and Forces

8.1: Newton's Laws of Motion

MATERIALS

o CCB Science pages

CCR STANDARDS

o

OBJECTIVES

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KEY CONCEPT

o

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Work, Motions, and Forces

8.2: Forces and Machines

MATERIALS

o CCB Science pages

CCR STANDARDS

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OBJECTIVES

o

KEY CONCEPT

o

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Chemical Properties

9.1: Matter

MATERIALS

- CCB Mathematics pages 302 - 355
- Worksheet: Matter - Chemical or Physical
- PowerPoint: Matter
- Experiment: Sugar Crystals

CCR STANDARDS

- 2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
- 9 Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

OBJECTIVES

- Recognize the four different states of matter
- Distinguish between chemical and physical properties and changes
- Explain the relationship between energy and states of matter

KEY CONCEPT

- Matter is anything that has mass and takes up space. Matter exists on Earth in one of four states - solid, liquid, gas, or plasma

VOCABULARY

Tier 2	o Stimulation
Tier 3	o Chemical Property o Element o Matter o Physical Property o State of Matter
Test Words	o Conclusion

BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

The States of Matter

Properties of Matter

Early Ideas About the Elements

CORE SKILL

Compare and Contrast Information

Read the text with students, and then ask them to compare and contrast the information they gather from both the diagram and the text. Afterward, invite students to discuss what they are able to observe in the illustrated simulation that they would not be able to observe in an experiment. Prompt students to recognize that in an experiment, they would be unable to see how a substance's particle structure changes as the environment changes.

Draw Conclusions

Read the text with students. Then organize students into small groups. Have each group review the list of changes and categorize them as chemical or physical changes. When students have completed the task, have someone from each group write the results on the board. Examine the results as a class, discussing and resolving any discrepancies that may exist. Encourage students to justify their decisions.

EXTENSION

Explain Connections

Revisit the concept map that students began building at the beginning of the lesson. Ask students to explain the connections they see in the map. Encourage students to add further information or clarify existing information.

Summarize a Multistep Procedure

EVIDENCE-BASED READING

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21ST CENTURY SKILL

o

INTERACTIVE STRATEGY

o Charts

WRITING TOPIC

o Experiment: Sugar Crystals

WRITING PRACTICE

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Have students use print or online materials to find examples of science experiments that demonstrate changes of state. Ask students to select an experiment, such as producing sugar crystals on a string or clouds in a bottle. Have students gather the necessary materials, follow the procedure, collect data, and summarize their findings in a presentation.

LESSON REVIEW

Chemical Properties

9.2: The Atom

MATERIALS

- CCB Mathematics pages 312 - 319
- Video: Our Friend the Atom
- Video: Bill Bye - Atoms and Molecules (1/2)
- Video: Bill Nye - Atoms and Molecules (2/2)
- Video: PBS - Making Stuff Smarter

CCR STANDARDS

- 1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support
- 7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

OBJECTIVES

- Describe the structure of an atom
- Identify properties of the elements using the periodic table of the elements

KEY CONCEPT

- Elements are made of tiny particles called atoms.

VOCABULARY

Tier 2	o Model o Neutral o Table
Tier 3	o Atom o Electron o Neutron o Proton
Test Words	o

EVIDENCE-BASED READING

BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

Structure or the Atom

Atomic Number and Atomic Mass

Organizing the Elements

Using the Periodic Table

Why the Table Works

CORE SKILL

Cite Textual Evidence

Remind students that two or more related sentences can form a paragraph, and that each paragraph has a main idea. That main idea is normally stated, often in the first or last sentence. The remaining sentences contain factual details, or information that support the main idea. Explain that factual details represent textual evidence, and readers can cite textual evidence to answer questions and justify their answers. Have volunteers read and summarize the first two paragraphs. Then read aloud the directions presented in the third paragraph and give students time to complete the task. Afterward, ask students to identify the sentence that states the paragraph's main idea. (the first sentence) Then ask them to explain the purpose of the remaining sentences. (facts that support the main idea)

Apply Scientific Models

Provide students with small, round objects or candies to model the parts of an atom. If possible, provide different colors for protons, neutrons, and electrons. Have students read the text and complete the activity. Encourage students to be creative with their models while also maintaining accuracy. Allow students to compare their models.

EXTENSION

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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Interact with the Periodic Table

Invite students to explore Earth's elements through the use of an interactive periodic table like the one available through Wikipedia. Project the table and invite volunteers to come forward to select an element and click on it to learn the element's name and properties. Have students identify and share one important fact about each of the elements they choose.

Design a Game

Challenge students to use a print or digital version of the periodic table to create a game to help younger learners learn about the relationship between atomic number and chemical and physical properties of elements. Have students focus on elements in groups I, II, VII, and VIII. Have students write the rules for their games, observe as players play their games,

LESSON REVIEW

Chemical Properties

9.3: Compounds and Molecules

MATERIALS

o CCB Science pages

CCR STANDARDS

o

OBJECTIVES

o

KEY CONCEPT

o

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Chemical Properties

MATERIALS

o CCB Science pages

CCR STANDARDS

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OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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9.4: Chemical Reactions and Solutions

BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Chemical Properties

9.5: The Chemistry of Life

MATERIALS

o CCB Science pages

CCR STANDARDS

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OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Chemical Properties

9.6: Chemical Equations

MATERIALS

o CCB Science pages

CCR STANDARDS

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OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Earth and Living Things

10.1: Cycles of Matter

MATERIALS

- CCB Mathematics pages 358 - 367
- PowerPoint: Cycles in Ecosystems

CCR STANDARDS

- 2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
- 3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

OBJECTIVES

- Define a biogeochemical cycle
- Identify five kinds of biogeochemical cycles

KEY CONCEPT

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VOCABULARY

Tier 2	o Producers o Weathering
Tier 3	o Algae o Biogeochemical Cycle o Detritivore o Nitrogen Fixers o Nutrient
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

BEFORE LESSON

Ask students to identify the source of the oxygen they breathe and the water they drink. Then ask them to describe what they think happens to the carbon dioxide that they exhale. Based on their answers, assess how much students recall about the ways in which living things are connected to their environments and the manner in which nutrients are recycled. Ask students to list the three states of matter (gas, liquid, solid).

GUIDED PRACTICE

- What are Nutrients?
- Biogeochemical Cycles
- Decomposers and Biological Cycles
- The Carbon Cycle
- The Oxygen Cycle
- The Hydrologic Cycle
- The Nitrogen Cycle
- The Phosphorus Cycle

CORE SKILL

Follow a Multistep Procedure

Review the steps in the procedure for examining the rate of decomposition of rubber latex balloons. If possible, have students use activators and materials to complete the procedure. In either case, discuss the value of writing and following numbered steps. Explain the value of following such explicit instructions for a scientific investigation makes the investigation reproducible.

Draw Conclusions

Ask students to read the text and write a conclusion about oxygen levels in water where large amounts of phosphorus contribute to increased plant growth. Invite students to share their conclusions, citing text details and their own knowledge to support their ideas.

EXTENSION

Explain a Cycle

Ask students to select one of the cycles discussed in the lesson and explain it in their own words. If possible, project the cycle they choose on

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WRITING TOPIC

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WRITING PRACTICE

o Have students review the text on the hydrologic cycle before beginning to write. Encourage students to make an outline before writing and use the outline to guide the development of their ideas.

the board or a wall and give students the option of pointing to elements in the diagram as they explain the process.

Interpret Information from a Graph

Have students conduct an online investigation to locate graphs summarizing water-use data in their town or state. Ask students to describe patterns or trends in the data and use the data to predict trends in the next decade. Invite students to share the graphs they found and explain their interpretations and predictions.

LESSON REVIEW

Earth and Living Things

10.2: Fossil Fuels

MATERIALS

o CCB Science pages

CCR STANDARDS

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OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Jason Kilpatrick

Earth

11.1: Geology

MATERIALS

- CCB Mathematics pages 382 - 389
- NOAA | Lesson 13: Plate Tectonics I

CCR STANDARDS

- 7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

OBJECTIVES

- Describe the structure of Earth
- Relate movement of Earth's crust to geologic activity
- Describe the three main types of rock and how they change in the rock cycle

KEY CONCEPT

- Earth is made of several layers. Rocks change form in a never-ending process called the rock cycle.

VOCABULARY

Tier 2	o
Tier 3	o Igneous o Inner Core o Metamorphic o Outer Core o Rock Cycle o Sedimentary
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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BEFORE LESSON

Determine students' readiness for learning about geology by asking them to describe what they know about the different ways that rocks can form. Prompt students as needed to determine how much general information they can recall about the processes that form igneous, sedimentary, and metamorphic rock.

BACKGROUND

GUIDED PRACTICE

- Earth's Structure
- Integrate Text and Visuals
- Movement of the Crust
- Weathering and Soil

CORE SKILL

Integrate Text and Visuals

Review the Formation of a Volcano and the Path of Volcanic Islands diagrams with students. Ask students to describe the specific ways in which the diagrams integrate, or build in, and support the text.

21st Century Skill: Initiative and Self-Direction

Have students read the text and find the definition of initiative (the ability to take action and follow through on completing a task) in the first paragraph. Point out that initiative and self-direction are important in all careers. Ask students to describe examples of situations in which workers in different fields need these qualities. Challenge students to suggest reasons why they might be especially important for someone who works alone in his or her own business.

Apply Scientific Models

Have student volunteers share their new models of the rock-cycle process. Invite class members to review and critique the models. Help students remember that any model must show that some of the steps of the rock cycle can move in either direction. Remind students that scientists often use models to help people understand a concept that they cannot observe

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

o Invite students to describe why a map illustrating how to get to a location might be more helpful than a written description of how to find that location. For example, ask students if two people are likely to provide the same written description, or if two people are likely to point out the same landmarks along the way.

directly.

EXTENSION

Promote Interactive Learning

When dividing students into groups, make sure each group contains both English language learners and fluent English speakers. Ask pairs to say and define the boldfaced words in the lesson. Have one student say the word and the other define the word. Then have them switch tasks. Fluent speakers can help English language learners with difficult vocabulary by explaining complex topics in simpler terms.

Draw Conclusions about Earthquakes

Have students visit the US Geological Survey's Web site to learn more about earthquakes. Allow students to discover how many earthquakes occur around the world every day. Then have them create a world map indicating where the ten most recent earthquakes over a magnitude of 6.0 occurred. Have students compare the distribution of these ten earthquakes to the boundaries of tectonic plates shown in the Plates and Quakes map on page 386, and ask students to draw conclusions about the relative likelihood of earthquakes in these areas.

LESSON REVIEW

Earth

11.2: Oceanography

MATERIALS

o CCB Science pages

CCR STANDARDS

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OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Jason Kilpatrick

Earth

11.3: Meteorology

MATERIALS

o CCB Science pages

CCR STANDARDS

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OBJECTIVES

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KEY CONCEPT

o

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

EVIDENCE-BASED READING

o

21ST CENTURY SKILL

o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Jason Kilpatrick

The Cosmos

12.1: Earth's Origins

MATERIALS

- CCB Mathematics pages 410 - 429

CCR STANDARDS

- 2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
- 4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

OBJECTIVES

- Describe the unique characteristics of Earth that allow it to sustain life
- Sequence events in the development of Earth and the Moon

KEY CONCEPT

- Earth, which formed 4.6 billion years ago, has unique characteristics that allow it to support life.

VOCABULARY

Tier 2	o habitable
Tier 3	o mantle o nebula
Test Words	o comprehension

EVIDENCE-BASED READING

-

21ST CENTURY SKILL

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BEFORE LESSON

Determine students' readiness for learning about Earth's origins by asking them to recall what they already know about how Earth was formed. Have students begin a KWL chart to connect what they already know, what they want to know, and what they will learn from the lesson.

BACKGROUND

GUIDED PRACTICE

- Earth and Its Origins
- Conditions for Life

CORE SKILL

Understand Science Texts

Before students begin reading the lesson, divide the class into teams of two. Ask one member of each team to read aloud the first paragraph on this page to the other team member, pausing to circle any word or phrase that seems confusing. When the first student is finished, direct the two team members to work together to look for descriptions, examples, or other context clues that can help the student better understand the text. Have team members switch roles and read the second paragraph.

Identify Hypotheses

Draw a flow chart with three boxes on the board (the third box should be large). In the first box, write the words Origins of Earth's Water. Have a volunteer write his or her summary of the current hypothesis in the second box of the flow chart. Invite students to research how scientists are investigating this hypothesis. Then have volunteers write a brief description of the investigations in the box following the hypothesis.

EXTENSION

Practice Pronunciation

Use the words in the vocabulary list to demonstrate pronunciation of multi-syllable words. After you have pronounced the words, ask students to do the same. Correct any mispronunciations.

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

o Invite students to share their written explanations of why they found a particular strategy effective for evaluating an online science article. Have them describe the strategy as steps in a sequence.

Compare Science and Myths

Challenge students to investigate a myth or legend that describes how Earth and the Moon came into existence. Suggest students compare what the myth or legend says to what they are learning and use a Venn diagram to compare the similarities and differences. (See the Graphic Organizer section of the Instructor Resource Binder for a blackline master of a Venn diagram.)

LESSON REVIEW

The Cosmos

12.2: Origins of the Universe

MATERIALS

- CCB Mathematics pages 414 - 417

CCR STANDARDS

- 2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
- 7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

OBJECTIVES

- Describe the big bang theory
- Discuss the origins of the elements that make up Earth

KEY CONCEPT

- According to the big bang theory, the universe began with an explosion of matter and energy from an extremely small and dense particle. The universe has been expanding ever since. Reactions that occur during the life cycle of a star form the elements found on Earth.

VOCABULARY

Tier 2	o assumption
Tier 3	o light-year o nebula o supernova
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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BEFORE LESSON

Invite students to recall what they learned about Earth's origins in the previous lesson. Ask questions, such as: How are crashing nebula related to the origins of stars and planets? What happened inside the clouds of gas and dust that led to the creation of the Sun and Earth? Students' answers will reveal their understanding of the enormous energy that leads to the birth of stars, the topic of this lesson.

BACKGROUND

GUIDED PRACTICE

- Origins of the Universe
- The Big Bang
- An Expanding Universe
- The "Life" of a Star
- Element Factories

CORE SKILL

Core Skill: Apply Scientific Models

Read the first paragraph of text with students. Then ask them to paraphrase the principle of Occam's Razor. Help students understand that observations can lead scientists to a simpler and more truthful explanation of an event. Read the last paragraph aloud, and ask students why, once scientists have formed an explanation, they continue to search for facts that support the explanation. Help students recognize that additional observations can further scientists' understanding of an event, or cause them to revise their thinking.

Determine the Conclusion of a Text

Read the text as a class. Invite several students to define the term assumption in their own words. As a class, review the lesson, seeking other examples of assumptions they can make based on the text.

EXTENSION

Revisit Vocabulary

Write the words light-year, nebula, and supernova on the board. Ask

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

o Read the task aloud to help students understand that they may choose any news article of interest to them. Then while reading, they should highlight or note the article's main points and use those points to determine if the writer used them to write a conclusion. If students select articles with conclusions, help them understand that their task is to evaluate the strengths and weaknesses of those conclusions. However, if they select articles with no conclusions, they should use the main points they noted to write conclusions.

students to explain each term in their own words, citing evidence from the text to support their explanations. Provide support, if necessary.

Show Time Scale

To help students gain an appreciation for the time scale involved in the formation of the universe, have them make a time line to show the following events: the big bang, formation of our solar system, and formation of Earth. Remind students to use a scale that can be shown with relative ease (for example, 1 inch = 1 billion years). Then they will write a summary explanation of the relationship between the events as illustrated on the time line.

LESSON REVIEW

The Cosmos

12.3: The Milkey Way and the Solar System

MATERIALS

- CCB Mathematics pages 418 - 423

CCR STANDARDS

- 6 Assess how point of view or purpose shapes the content and style of a text.
- 8 Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

OBJECTIVES

- Describe the Milky Way galaxy
- Identify the objects that make up the solar system
- Understand the definition of a planet

KEY CONCEPT

- Earth is one of eight planets that orbit the Sun in our solar system. Other objects in the solar system include asteroids, dwarf planets, and comets.

VOCABULARY

Tier 2	o criteria
Tier 3	o asteroid o comet o galaxy o satellite o solar system
Test Words	o bias

EVIDENCE-BASED READING

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21ST CENTURY SKILL

BEFORE LESSON

Determine students' readiness for learning about the Milky Way and the Solar System by gauging how much students can recall about the stars, constellations, and planets that make up the Milky Way galaxy. Ask students to share their ideas about what they think a planet is, and ask them why a star is not a planet.

BACKGROUND

GUIDED PRACTICE

- The Milky Way Galaxy
- The Solar System
- The Planets

CORE SKILL

Analyze Author's Purpose

Have students identify clues that help them determine that the lesson is informational text. Point out to students that topics are introduced at the beginnings of paragraphs, with details following in the subsequent sentences. For example, point out that the second paragraph introduces the concept of inner planets and then discusses their characteristics, while the third paragraph introduces the outer planets and then discusses their features.

Evaluate Conclusions

Guide students through the second paragraph on this page, which discusses Pluto's new classification as a dwarf planet. Ask students how and why Pluto was reclassified and guide them to the recognition that scientists reevaluate conclusions whenever new information becomes available.

EXTENSION

Recognizing Bias

To demonstrate author's bias, write two sentences on the board: one that is a fact and another that is an opinion. Ask a volunteer to identify which is which. Then have students ·write fact or opinion sentences and have

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

o Ask students to discuss how they can identify the differences among informative text, entertaining text, and persuasive text. Invite student volunteers to read aloud the three paragraphs that they have written and challenge the rest of the class to identify the type of writing used in each paragraph.

others identify them.

Collect and Display Information about the Solar System

Have students make a mobile of the solar system, organizing the eight planets at their relative distances from the Sun. Students should estimate the relative sizes of the planets and distinguish between the inner planets and the outer planets. Students can also include other celestial objects of their choosing. All of the pieces should be labeled. Allow them to do further research if they need additional information.

LESSON REVIEW

The Cosmos

12.4: Earth and the Moon

MATERIALS

- CCB Mathematics pages 418 - 423

CCR STANDARDS

- 1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- 7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

OBJECTIVES

- Relate Earth's motion to day and night and to the seasons
- Discuss the characteristics that make Earth habitable for living things
- Identify the interactions between the Earth, Sun, and Moon

THAT CAUSE THE PHASES OF THE MOON AND TIDES

KEY CONCEPT

- Earth is in constant motion. It turns on its axis, causing the cycle of day and night. Earth's tilt on its axis and its movement around the Sun result in Earth's seasons. Earth's distance from the Sun makes it habitable, a place for living things.

VOCABULARY

Tier 2	o Interactions o Revolution o Rotation o tides

BEFORE LESSON

Begin a concept map on the board or on a large sheet of paper attached to a wall. Draw a circle in the center of the map and label it Earth. Invite students to add information about Earth to the concept map, making has many connections as possible. Use students' contributions to the map to determine their readiness for the lesson.

BACKGROUND

GUIDED PRACTICE

- Earth's Journey
- A Habitable Planet
- The Moon
- Tides

CORE SKILL

Cite Textual Evidence

In their reading and discussion of the section "A Habitable Planet," students recorded the attributes that make Earth habitable. Ask students to return to their statements and cite specific evidence from the text to support their statements.

Apply Scientific Models

Read the text as a class and discuss the lunar cycle and what questions students may have about the existing models scientists use. Give students time to contact experts or consult print or online resources to find the answers to their questions. Encourage students to share their findings. As a class, discuss any discrepancies that students have found among their answers. Ask them to suggest ways to resolve these discrepancies.

EXTENSION

Explain the Seasons

Explaining the occurrence of seasons is challenging for many students. While you use the globe to model Earth's revolution around the Sun, ask students to explain the differences in the angle of light reaching each part of the globe at different points along its orbit. You may want to use a

Tier 3	o habitable o phase
Test Words	o

EVIDENCE-BASED READING

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21ST CENTURY SKILL

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INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

o Remind students that they are writing two paragraphs describing a favorite sport or hobby, and that each paragraph must have its own main idea supported by specific details. For example, if students write about playing tennis, the main idea of the first paragraph might be the sport's history, and the main idea of the second paragraph might be the current rules of the game.

flashlight to represent the Sun. Engage students in a discussion of how the changing angle of light results in seasons in the northern and southern hemispheres.

Collect and Display Data

Have students research the most effective and safest ways to observe a solar eclipse. Ask students to create a guide for viewing a solar eclipse that includes safety measures, viewing tips, and an explanation of why eclipses happen. Encourage students to illustrate their guides to assist in explaining important steps, precautions, or information.

LESSON REVIEW