Focus on California Earth Science

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CALIFORNIA SCIENCE EXPLORER

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Pearson Prentice Hall ISBN 0-13-201274-X
Pearson Scott Foresman ISBN 0-328-24653-0
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Earth Systems and Processes

Focus on the BIG Idea

What is one main source of energy for Earth's natural processes and living things?

Chapter 1

Focus on the BIG Idea

What are the effects of weathering of rock?

Chapter 2

Chapter 3

Erosion and Deposition 82

Focus on the
BIG Idea

What are the forces of erosion and deposition that shape our landscape?

Unit 2

Plate Tectonics and Earth's Structure

Focus on the BIG Idea

What are Earth's plates, and how do their movements change our planet's surface?

Chapter 4

Focus on the BIG Idea

How do plate motions affect Earth's crust?

Chapter 5

Chapter 6

Focus on the
BIG Idea

What causes volcanoes and how do they change Earth's surface?

Unit 3

Weather and Climate

Focus on the BIG Idea

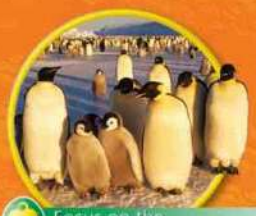
How do air pressure and temperature vary in the atmosphere?

Focus on the BIG Idea

Which weather factors produce changes in weather?

Chapter 9

Climate and Climate Change 340



Focus on the
BIG Idea

What are the major factors that influence a region's climate?

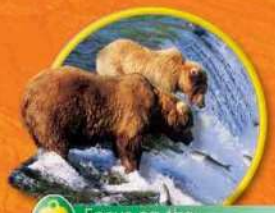
Unit 4

Ecology and Resources

Focus on the BIG Idea

What relationships exist between living things and the environment?

Chapter 10



Focus on the BIG Idea

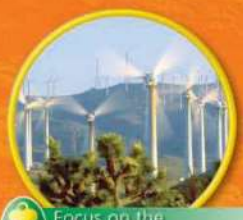
What defines the ecological roles and adaptations of the organisms found in different biomes?

Chapter 11

Chapter 12

Energy and Material Resources 472

Reference Section



Focus on the
BIG Idea

What are the advantages and disadvantages of various energy resources?

Activities

Lab zone Standards Warm-Up

Exploration and inquiry before reading

Lab zone Try This Activity — Reinforcement of key concepts

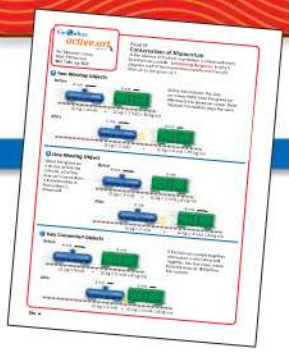
Lab zone Skills Activity — Practice of specific science inquiry skills

Lab zone At-Home Activity — Quick, engaging activities for home and family

• Tech & Design • — Design, build, test, and communicate

Math — Point-of-use math practice

active art Illustrations come alive online



Video Field Trip
Discovery Channel School

Enhance understanding through dynamic video.

Preview Get motivated with this introduction to the chapter content.

Field Trip Explore a real-world story related to the chapter content.

Assessment Review content and take an assessment.

Go Online
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Get connected to exciting Web resources in every lesson.

SCILINKS NSTA Find Web links on topics relating to every section.

Active Art Interact with selected visuals from every chapter online.

Planet Diary® Explore news and natural phenomena through weekly reports.

Science News® Keep up to date with the latest science discoveries.

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Videos Explore content and learn important lab skills.

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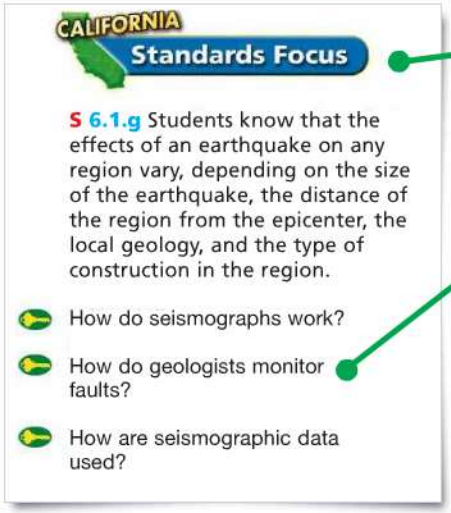
Self-Assessment Use instant feedback to help you track your progress.

CALIFORNIA Science Content Standards

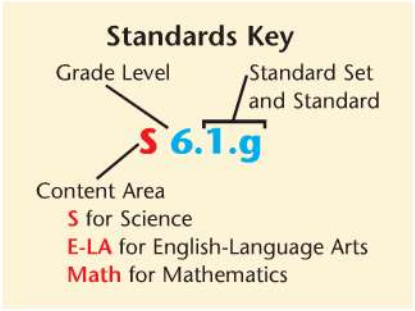
This textbook is organized to support your understanding of the California Science Content Standards. Understanding this organization can help you master the standards.

Every chapter begins with a Focus on the Big Idea question that is linked to a California Science Standard. Focus on the Big Idea poses a question for you to think about as you study the chapter. You will discover the answer to the question as you read.



Each section begins with a Standards Focus. You will learn about these California Science Standards as you read the section.

The Standards Focus is broken down into two to four Key Concept questions. You will find the answers to these questions as you read the section.



The next several pages will introduce you to the California Science Content Standards for Grade 6. There are seven sets of standards that cover the material you will be learning this year. Each standard set contains several specific standards that tell you what you need to know. For Grade 6, these standards focus mainly on earth science. Some of the standards also help you learn about relationships between earth science and other branches of science.

STANDARD SET 1

Plate Tectonics and Earth's Structure

1. Plate tectonics accounts for important features of Earth's surface and major geologic events. As a basis for understanding this concept:

1. a. *Students know* evidence of plate tectonics is derived from the fit of the continents; the location of earthquakes, volcanoes, and midocean ridges; and the distribution of fossils, rock types, and ancient climatic zones.
1. b. *Students know* Earth is composed of several layers: a cold, brittle lithosphere; a hot, convecting mantle; and a dense, metallic core.
1. c. *Students know* lithospheric plates the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle.

What It Means to You

You will learn about the structure of Earth and how scientists have identified that structure. You will learn that Earth is divided into layers. The top layer is the crust, which is divided into giant sections called plates. These plates move very slowly around Earth's surface. Volcanoes and earthquakes are common where one plate slides past or under another plate.

Where You Will Learn It

Chapter 4

STANDARD SET 1, continued

1. d. *Students know* that earthquakes are sudden motions along breaks in the crust called faults and that volcanoes and fissures are locations where magma reaches the surface.
1. e. *Students know* major geologic events, such as earthquakes, volcanic eruptions, and mountain building, result from plate motions.
1. f. *Students know* how to explain major features of California geology (including mountains, faults, volcanoes) in terms of plate tectonics.
1. g. *Students know* how to determine the epicenter of an earthquake and know that the effects of an earthquake on any region vary, depending on the size of the earthquake, the distance of the region from the epicenter, the local geology, and the type of construction in the region.

What It Means to You

You will learn how the motion of Earth's plates causes earthquakes and volcanoes and builds mountains. Moving plates shaped many features of California's landscape, such as its mountain ranges and faults. You will also learn how scientists measure and locate earthquakes, and what determines how much damage an earthquake does.

Where You Will Learn It

Chapters 4, 5, and 6

STANDARD SET 2

Shaping Earth's Surface

2. Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment. As a basis for understanding this concept:

2. a. *Students know* water running downhill is the dominant process in shaping the landscape, including California's landscape.
2. b. *Students know* rivers and streams are dynamic systems that erode, transport sediment, change course, and flood their banks in natural and recurring patterns.
2. c. *Students know* beaches are dynamic systems in which the sand is supplied by rivers and moved along the coast by the action of waves.
2. d. *Students know* earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.

What It Means To You

You will learn about the forces that shape Earth's surface. Moving water is the most important of these forces. You will learn how rivers and oceans shape the land by eroding, or wearing away, material and carrying that material to other places. You will also learn how rapid natural events such as earthquakes, volcanoes, landslides, and floods shape the land. These events can affect all living things, including humans, and can have effects that last long after the event itself.

Where You Will Learn It

Chapters 3, 5, 6, and 10

STANDARD SET 3

Heat (Thermal Energy) (Physical Science)

3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:

3. a. *Students know* energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.

3. b. *Students know* that when fuel is consumed, most of the energy released becomes heat energy.

What It Means to You

You will learn what energy is and how it is transmitted from place to place. Energy can exist in many forms, but in all forms, it is the ability to do work or cause a change. You will learn how waves, heat, and moving objects carry energy. You will also learn how energy can change from one form to another. One example is the burning of a fuel such as coal in a power plant. The fuel's stored energy is changed into other forms. Some of the energy becomes electricity, but most of it becomes heat.

Where You Will Learn It

Chapters 1 and 12

STANDARD SET 3, continued

3. c. *Students know know* heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and by convection (which involves flow of matter).
3. d. *Students know* heat energy is also transferred between objects by radiation (radiation can travel through space).

What It Means to You

You will learn the three ways in which heat can flow between objects. You will learn that two of these ways, conduction and convection, need matter in order to transfer heat. Conversely, radiation can transfer energy through empty space. You will learn how each of these processes transfers heat, and discover examples of each process.

Where You Will Learn It

Chapters 1, 4, and 7

CALIFORNIA

STANDARD SET 4

Energy in the Earth System

4. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept:

4. a. *Students know* the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.

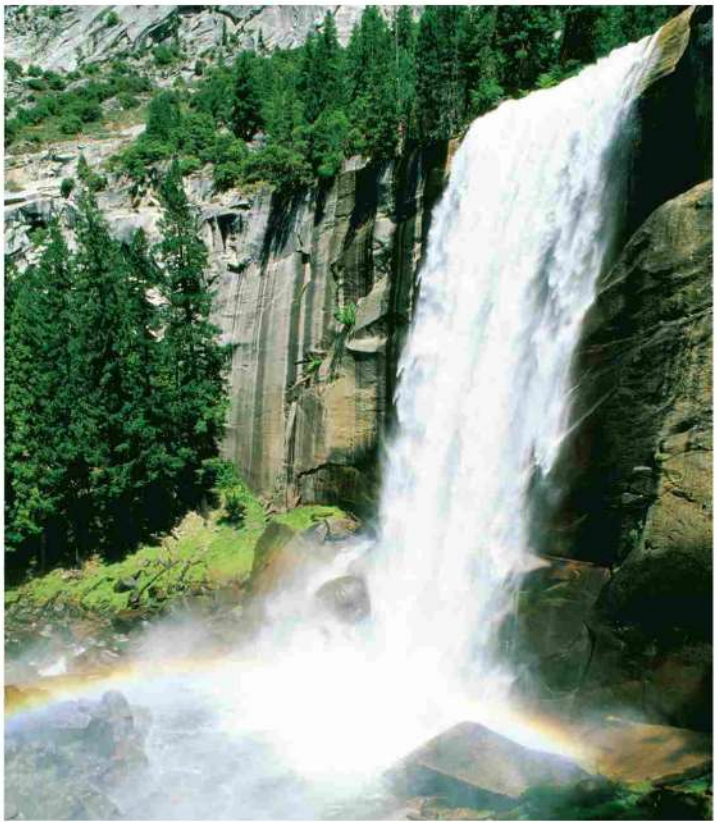
4. b. *Students know* solar energy reaches Earth through radiation, mostly in the form of visible light.

What It Means to You

You will learn that the sun provides most of the energy that powers events on Earth. This energy travels to Earth through radiation. You will also learn that wind, ocean currents, and weather all get their energy directly or indirectly from the Sun. You will understand how the sun's energy drives air and water movements on Earth.

Where You Will Learn It

Chapters 7, 8, and 9



STANDARD SET 4, continued

4. c. *Students know* heat from Earth's interior reaches the surface primarily through convection.
4. d. *Students know* convection currents distribute heat in the atmosphere and oceans.
4. e. *Students know* differences in pressure, heat, air movement, and humidity result in changes of weather.

What It Means to You

You will learn how heat is transferred inside Earth and in Earth's atmosphere and oceans. You will see that convection currents caused by changing amounts of heat bring energy from deep inside Earth to the surface. Similar currents carry heat through the atmosphere and oceans. You will learn how these currents, along with changes in pressure and the amount of water in the air, cause changes in the weather.

Where You Will Learn It

Chapters 4, 7, 8, and 9

STANDARD SET 5

Ecology (Life Sciences)

5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:

5. a. *Students know* energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.

5. b. *Students know* matter is transferred over time from one organism to others in the food web and between organisms and the physical environment.

What It Means to You

You have seen how energy is transferred through the nonliving parts of Earth. In this standard set, you will learn how energy is transferred among living things and between living things and their environments. Living things depend on energy from the sun. You will learn how some organisms, such as plants, use this energy to store chemical energy in the form of food. Some organisms gain their energy by eating other organisms. You will learn to trace how energy and matter move between and among living things.

Where You Will Learn It

Chapters 10 and 11

STANDARD SET 5, continued

5. c. *Students know* populations of organisms can be categorized by the functions they serve in an ecosystem.
5. d. *Students know* different kinds of organisms may play similar ecological roles in similar biomes.
5. e. *Students know* the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

What It Means to You

You will learn about the different roles organisms play in the ecosystems in which they live. You will also learn to compare different ecosystems. You will see that different organisms can play the same role in different ecosystems. The types of organisms that can live in an environment depend on both the nonliving parts of the environment (such as its soil and light) and on living parts of the environment (such as plants and animals).

Where You Will Learn It

Chapters 10 and 11

CALIFORNIA

STANDARD SET 6

Resources

6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept:

6. a. *Students know* the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process.

6. b. *Students know* different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.

6. c. *Students know* the natural origin of the materials used to make common objects.

What It Means to You

Humans depend on their environments for many useful materials, called natural resources. People use some of these resources to produce energy. Others can be made into objects that people need and want. You will learn that some resources can be replaced relatively quickly, while others cannot be replaced once they are used up. You will be able to list and describe some examples of each type. You will also learn how to tell the difference between these two types of resources.

Where You Will Learn It

Chapters 2, 7, 11, and 12

STANDARD SET 7

Investigation and Experimentation

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

7. a. Develop a hypothesis.
7. b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
7. c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.
7. d. Communicate the steps and results from an investigation in written reports and oral presentations.
7. e. Recognize whether evidence is consistent with a proposed explanation.
7. f. Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.
7. g. Interpret events by sequence and time from natural phenomena (e.g., the relative ages of rocks and intrusions).
7. h. Identify changes in natural phenomena over time without manipulating the phenomena (e.g., a tree limb, a grove of trees, a stream, a hillslope).

What It Means to You

You will learn how scientists gather, display, and interpret information. You will perform your own experiments and investigations and learn to draw conclusions from the data you collect. For instance, you will build a weather station and use it to collect data about the weather in your area. You will also learn to read graphs and maps, and to identify how an object or an area changes over time.

Where You Will Learn It

This material is covered in the labs and activities you will do and in Chapter 1.

Your Keys to Success

Read for Meaning

This textbook has been developed to fully support your understanding of the science concepts in the California Science Standards. Each chapter contains built-in reading support.

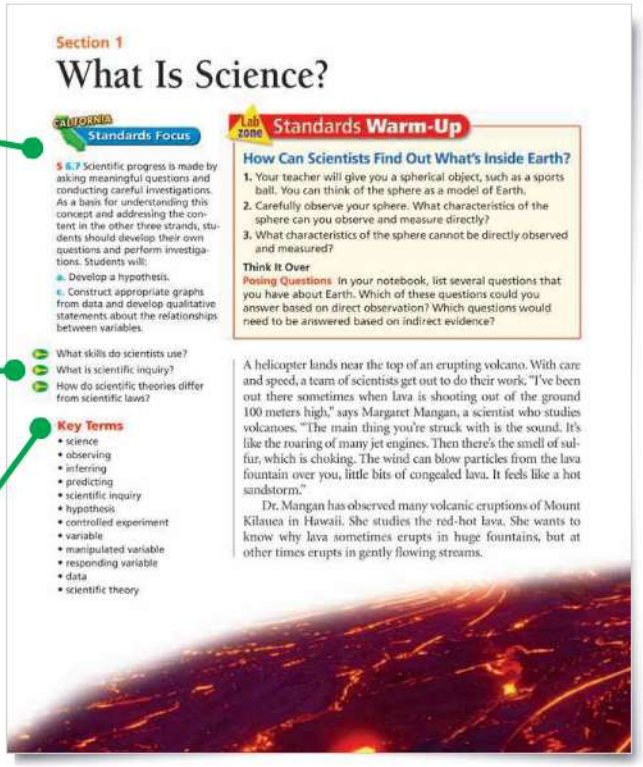
Before You Read

Use the Standards Focus to preview the California Science Standards that are covered, the key concepts, and key terms in the section.

Standards Focus The California Science Standards that you will learn are listed at the beginning of each section.

Key Concepts Each science standard is broken down into smaller ideas called Key Concepts.

Key Terms Use the list of key terms to preview the vocabulary for each section.



Section 1

What Is Science?

CALIFORNIA Standards Focus

S 6.7 Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

a. Develop a hypothesis.

c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.

- What skills do scientists use?
- What is scientific inquiry?
- How do scientific theories differ from scientific laws?

Key Terms

- science
- observing
- inferring
- predicting
- scientific inquiry
- hypothesis
- controlled experiment
- variable
- manipulated variable
- responding variable
- data
- scientific theory

Lab zone Standards Warm-Up

How Can Scientists Find Out What's Inside Earth?

1. Your teacher will give you a spherical object, such as a sports ball. You can think of the sphere as a model of Earth.
2. Carefully observe your sphere. What characteristics of the sphere can you observe and measure directly?
3. What characteristics of the sphere cannot be directly observed and measured?

Think It Over

Posing Questions In your notebook, list several questions that you have about Earth. Which of these questions could you answer based on direct observation? Which questions would need to be answered based on indirect evidence?

A helicopter lands near the top of an erupting volcano. With care and speed, a team of scientists get out to do their work. "I've been out there sometimes when lava is shooting out of the ground 100 meters high," says Margaret Mangan, a scientist who studies volcanoes. "The main thing you're struck with is the sound. It's like the roaring of many jet engines. Then there's the smell of sulfur, which is choking. The wind can blow particles from the lava fountain over you, little bits of congealed lava. It feels like a hot sandstorm."

Dr. Mangan has observed many volcanic eruptions of Mount Kilauea in Hawaii. She studies the red-hot lava. She wants to know why lava sometimes erupts in huge fountains, but at other times erupts in gently flowing streams.

As You Read

Key Concepts in boldface sentences allow you to focus on the important ideas of the chapter.

Look for the green and yellow keys to find the key concepts in each section.

Skills Scientists Use

Science is the study of the natural world. Science includes all of the knowledge gained by exploring nature. To think and work like a scientist, you need to use the same skills that they do.

Scientists use the skills of observing, inferring, and predicting to learn more about the natural world.

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Observing Scientists observe things. **Observing** means using one or more senses to gather information. Your senses include sight, hearing, touch, taste, and smell. Each day of your life, you observe things that help you decide what to eat, what to wear, and whether to stay inside or go out.

Scientists usually make observations in a careful, orderly way. They make both qualitative and quantitative observations. Qualitative observations are descriptions that don't involve numbers or measurements. Noticing that a ball is round, that milk smells sour, or that a car is moving is a qualitative observation. Quantitative observations are measurements. You make a quantitative observation when you measure your height or weight. In science, observations may also be called evidence, or data.

Inferring When you explain your observations, you are **inferring**, or making an inference. Inferences are based on reasoning from what you already know. You make inferences all the time without thinking about it. For example, your teacher gives lots of surprise quizzes. So if your teacher walks into the room carrying a stack of paper, you may infer that the pages contain a quiz. But inferences are not always correct. The papers could be announcements to be taken home.

Predicting Every day, people make statements about the future. **Predicting** means making a forecast of what

n past experience or
ientists predict the
and current infor-
t is based on data,
s.

based on?

FIGURE 1 Inferring
When you explain or interpret your observations, you are making an inference. **Inferring** *How do you think these young women obtained the stuffed bear? Explain your reasoning.*

Go Online active art
For: Mass Movement activity
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Creep Creep is the very slow downhill movement of rock and soil. It can even occur on gentle slopes. Creep often results from the freezing and thawing of water in cracked layers of rock beneath the soil. Like the movement of an hour hand on a clock, creep is so slow you can barely notice it. But you can see the effects of creep in objects such as telephone poles, gravestones, and fenceposts. Creep may tilt these objects at spooky angles. Landscapes affected by creep may have the eerie, out-of-kilter look of a funhouse in an amusement park.

Reading Checkpoint: What is the main difference between a slump and a landslide?

Section 1 Assessment

§ 6.2; E-LA: Reading 6.1.9

Vocabulary Skill Latin Word Origins Review the Latin word *de-* and *positus*. Use what you've learned to explain the meaning of *deposition*.

Reviewing Key Concepts

1. a. Listing What are five agents of erosion?
   b. Defining In your own words, write a definition of *erosion*.
   c. Predicting Over time, how will erosion and deposition affect a mountain range? Explain.
2. a. Listing What are the four types of mass movement?
   b. Relating Cause and Effect What force causes all types of mass movement?
   c. Inferring A fence runs across a steep hillside. The fence is tilted downhill and forms a curve rather than a straight line. What can you infer happened to the fence? Explain.

Lab zone At-Home Activity

Evidence of Erosion After a rainstorm, take a walk with an adult family member around your neighborhood. Look for evidence of erosion. Try to find areas where there is loose soil, sand, gravel, or rock. **CAUTION:** *Stay away from any large pile of loose sand or soil—it may slide without warning.* Which areas have the most erosion? The least erosion? How does the slope of the g affect the amount of erosion? Sketch or take photographs of the areas showing evidence of erosion.

After You Read

The Section Assessment tests your understanding of the Key Concepts. Each bank of Reviewing Key Concept questions here focuses on one of the Key Concepts.

If you can't answer these items, go back and review the section.

Your Keys to Success

How to Read Science

Reading Skill

The target reading skills introduced on this page will help you read and understand information in this textbook. Each chapter introduces a reading skill. Developing these reading skills is key to becoming a successful reader in science and other subject areas.

Preview Text Structure By understanding how textbooks are organized, you can gain information from them more effectively. This textbook is organized with red headings and blue subheadings. Before you read, preview the headings. Ask yourself questions to guide you as you read. (Chapter 1)

Preview Visuals The visuals in your science textbook provide important information. Visuals are photographs, graphs, tables, diagrams, and illustrations. Before you read, take the time to preview the visuals in a section. Look closely at the title, labels, and captions. Then ask yourself questions about the visuals. (Chapter 2)

Sequence Many parts of a science textbook are organized by sequence. Sequence is the order in which a series of events occurs. Some sections may discuss events in a process that has a beginning and an end. Other sections may describe a continuous process that does not have an end. (Chapters 3 and 10)

Compare and Contrast Science texts often make comparisons. When you compare and contrast, you examine the similarities and differences between things. You can compare and contrast by using a table or a Venn diagram. (Chapters 8 and 12)

Identify Main Ideas As you read, you can understand a section or paragraph more clearly by finding the main idea. The main idea is the most important idea. The details in a section or paragraph support the main idea. Headings and subheadings can often help you identify the main ideas. (Chapters 5 and 11)

Identify Supporting Evidence Science textbooks often describe the scientific evidence that supports a theory or hypothesis. Scientific evidence includes data and facts, information whose accuracy can be confirmed by experiments or observation. A hypothesis is a possible explanation for observations made by scientists or an answer to a scientific question. (Chapter 4)

Create Outlines You can create outlines to help you clarify the text. An outline shows the relationship between main ideas and supporting details. Use the text structure—headings, subheadings, key concepts, and key terms—to help you figure out information to include in your outline. (Chapter 6 and 9)

Take Notes Science chapters are packed with information. Taking good notes is one way to help you remember key ideas and to see the big picture. When you take notes, include key ideas, a few details, and summaries. (Chapter 7)

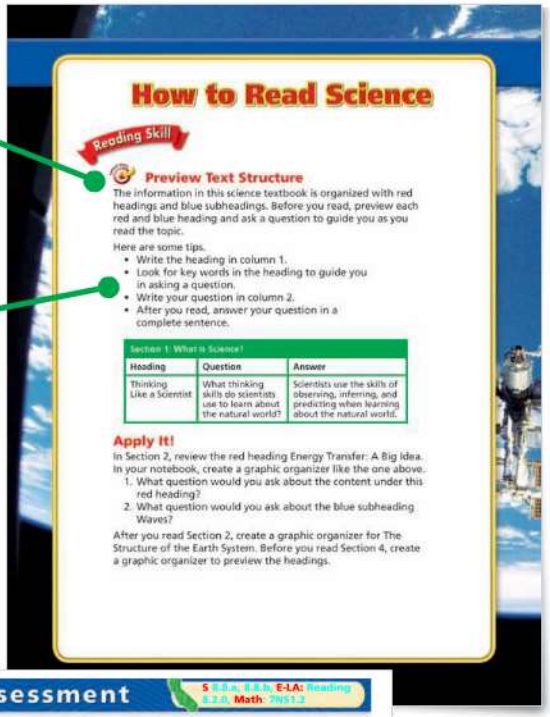
Target Reading Skills

Each chapter provides a target reading skill with clear instruction to help you read and understand the text. You will apply the skill as you read. Then you will record what you've learned in the section and chapter assessments.

Before You Read
Each chapter introduces a target reading skill and provides examples and practice exercises.

As You Read
As you read, you can use the target reading skill to help you increase your understanding.

After You Read
You can apply the target reading skill in the Section Assessments and in the Chapter Assessments.



How to Read Science

Reading Skill

Preview Text Structure

The information in this science textbook is organized with red headings and blue subheadings. Before you read, preview each red and blue heading and ask a question to guide you as you read the topic.

Here are some tips.

- Write the heading in column 1.
- Look for key words in the heading to guide you in asking a question.
- Write your question in column 2.
- After you read, answer your question in a complete sentence.

Section 1: What is Science?

Heading	Question	Answer
Thinking Like a Scientist	What thinking skills do scientists use to learn about the natural world?	Scientists use the skills of observing, inferring, and predicting when learning about the natural world.

Apply It!

In Section 2, review the red heading Energy Transfer: A Big Idea. In your notebook, create a graphic organizer like the one above.

1. What question would you ask about the content under this red heading?
2. What question would you ask about the blue subheading Waves?

After you read Section 2, create a graphic organizer for The Structure of the Earth System. Before you read Section 4, create a graphic organizer to preview the headings.

Section 3 Assessment

S 8.8.a, 8.8.b; E-LA: Reading 8.2.0; Math: 7NS1.2

Target Reading Skill Preview Text Structure
Complete the graphic organizer for this section. What question did you ask about Weight and Mass? What was your answer?

Reviewing Key Concepts

1. a. Identifying What is the standard measurement system used by scientists around the world?
   b. Predicting Suppose that two scientists use different measurement systems in their work. What problems might arise if they shared their data?
2. a. Listing What are the SI units of length, mass, volume, density, time, and temperature?
   b. Estimating Estimate the length of a baseball bat and mass of a baseball in SI units. How can you check how close your estimates are?
   c. Describing Outline a step-by-step method for determining the density of a baseball.

Math Practice

Two solid cubes have the same mass. They each have a mass of 50 g.

3. Calculating Density Cube A has a volume of 2 cm × 2 cm × 2 cm. What is its density?
4. Calculating Density Cube B has a volume of 4 cm × 4 cm × 4 cm. What is its density?

Your Keys to Success

Build Science Vocabulary

Vocabulary Skill

Studying science involves learning a new vocabulary. Here are some vocabulary skills to help you learn the meaning of words you do not recognize.

Word Analysis You can use your knowledge of word parts—prefixes, suffixes, and roots—to determine the meaning of unfamiliar words.

Prefixes A prefix is a word part that is added at the beginning of a root or base word to change its meaning. Knowing the meaning of prefixes will help you figure out new words. You will practice this skill in Chapter 12.

Suffixes A suffix is a letter or group of letters added to the end of a word to form a new word with a slightly different meaning. Adding a suffix to a word often changes its part of speech. You will practice this skill in Chapter 2.

Word Origins Many science words come to English from other languages, such as Greek and Latin. By learning the meaning of a few common Greek and Latin roots, you can determine the meaning of new science words. You will practice this skill in Chapters 3, 4, and 7.

Use Clues to Determine Meaning

When you come across a word you don't recognize in science texts, you can use context clues to figure out what the word means. First look for clues in the word itself. Then look at the surrounding words, sentences, and paragraphs for clues. You will practice this skill in Chapter 6.

Identify Multiple Meanings

To understand science concepts, you must use terms precisely. Some familiar words may have different meanings in science. Watch for these multiple-meaning words as you read. You will practice this skill in Chapter 8.

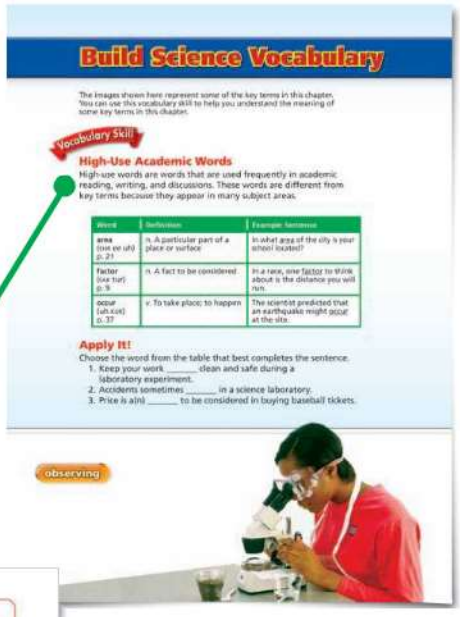
Identify Related Word Forms

You can increase your vocabulary by learning related forms of words or word families. If you know the meaning of a verb form, you may be able to figure out the related noun and adjective forms. You will practice this skill in Chapter 10.

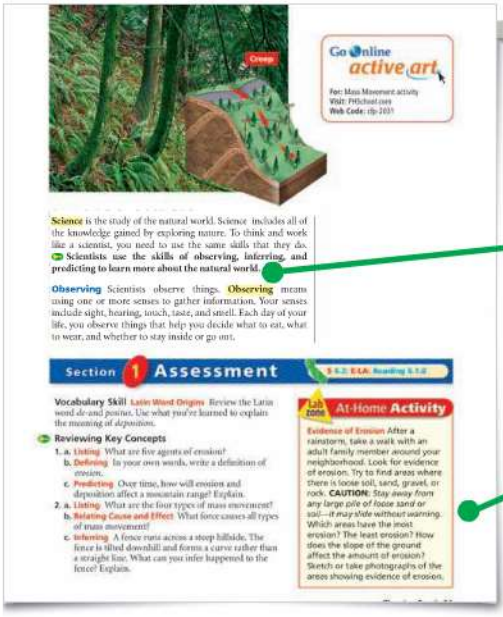
atmos + sphaira = atmosphere
vapor sphere a layer of
gas vapor or
gases that
surrounds
Earth

Vocabulary Skills

One of the important steps in reading this science textbook is to be sure that you understand the key terms. Your book shows several strategies to help learn important vocabulary.



Before You Read
Each chapter introduces a Vocabulary Skill with examples and practice exercises. Key terms come alive through visuals. The beginning of each section lists the key terms.



As You Read
Each key term is highlighted in yellow, appears in boldface type, and is followed by a definition.

After You Read
You can practice the Vocabulary Skill in the Section Assessments. You can apply your understanding of the key terms in the Chapter Assessments.

Your Keys to Success

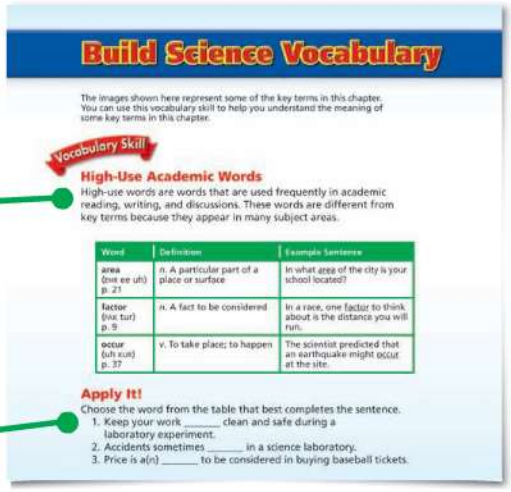
Build Science Vocabulary

High-Use Academic Words

High-use academic words are words that are used frequently in classroom reading, writing, and discussions. They are different from key terms because they appear in many subject areas.

Learn the Words
Each unit contains a chapter that introduces high-use academic words. The introduction describes the words, provides examples, and includes practice exercises.

Practice Using the Words
You can practice using the high-use academic words in the Section Assessments.



Build Science Vocabulary

The images shown here represent some of the key terms in this chapter. You can use this vocabulary skill to help you understand the meaning of some key terms in this chapter.

Vocabulary Skill

High-Use Academic Words

High-use words are words that are used frequently in academic reading, writing, and discussions. These words are different from key terms because they appear in many subject areas.

Word	Definition	Example Sentence
area (ehr ee uh) p. 21	*n.* A particular part of a place or surface	In what area of the city is your school located?
factor (fak tur) p. 9	*n.* A fact to be considered	In a race, one factor to think about is the distance you will run.
occur (uh kur) p. 37	*v.* To take place; to happen	The scientist predicted that an earthquake might occur at the site.

Apply It!

Choose the word from the table that best completes the sentence.

1. Keep your work _____ clean and safe during a laboratory experiment.
2. Accidents sometimes _____ in a science laboratory.
3. Price is a(n) _____ to be considered in buying baseball tickets.

Focus on Earth Science High-Use Academic Words

Learning the meaning of these words will help you improve your reading comprehension in all subject areas.

alter	contribute	factor	occur	remove
area	convert	feature	percent	resource
category	convert	feature	physical	reverse
channel	define	function	positive	series
concept	detect	generate	predictable	source
conduct	distinct	indicate	principle	structure
constant	diversity	individual	process	sustain
construct	enable	interpret	process	technique
consumer	environment	layer	proportion	theory
contact	estimate	major	range	transfer
contract	expand	method	region	trigger
contrast	exposure	obtain	reject	uniform
			release	vary

Investigations

You can explore the concepts in this textbook through inquiry. Like a real scientist, you can develop your own scientific questions and perform labs and activities to find answers. Follow the steps below when doing a lab.

1 **Read the whole lab.**

2 **Write a purpose.** What is the purpose of this activity?

3 **Write a hypothesis.** What is a possible explanation? Hypotheses lead to predictions that can be tested.

4 **Follow each step in the procedure.** Pay attention to safety icons.

Lab zone Skills Lab
Guided Inquiry

Speeding Up Evaporation

Materials

Problem What factors increase the rate at which water evaporates?

Skills Focus developing hypotheses, controlling variables, drawing conclusions

Procedure

PART 1 Effect of Heat

1. How does heating a water sample affect how fast it evaporates? Record your hypothesis.
2. Place each petri dish on an index card.
3. Add a single drop of water to each of the petri dishes. Try to make the two drops the same size.
4. Position the lamp over one of the dishes as a heat source. Turn on the light. Make sure the light does not shine on the other dish. CAUTION: The light bulb will become very hot. Avoid touching the bulb or getting water on it.
5. Observe the dishes every 3 minutes to see which sample evaporates faster. Record your result.

PART 2 Effect of Wind

6. How does fanning the water affect how fast it evaporates? Record your hypothesis.
7. Dry both petri dishes and place them over the index cards. Add a drop of water to each dish as you did in Step 3.
8. Use an index card to fan one of the dishes for 5 minutes. Be careful not to fan the other dish.
9. Observe the dishes to see which sample evaporates faster. Record your result.

Analyze and Conclude

1. Developing Hypotheses Did the evidence support both hypotheses? If not, which hypothesis was not supported?
2. Controlling Variables What was the manipulated variable in this experiment? The responding variable?
3. Drawing Conclusions Make a general statement about factors that increase the rate at which the water evaporates.
4. Communicating Write a report explaining the steps and results from your investigation. Explain what everyday experiences helped you develop your hypotheses.

Design an Experiment

How does increasing the surface area of a water sample affect how fast it evaporates? Write your hypothesis and then design an experiment to test it. Obtain your teacher's permission before carrying out your investigation.

5 **Record your data.**

Data Table

Object	Volume (cm³)	Mass (g)	Density (g/cm³)
Wooden stick			
Rock			
Piece 1			
Piece			

You can present your result orally.

6 **Analyze your results.** Answering the questions will help you draw conclusions.

Lab Report

Purpose: To determine how to speed up the evaporation of liquids.

Hypothesis:

7 **Communicate your results in a written report or oral presentation.** Your report should include:

- a hypothesis
- a purpose
- the steps of the procedure
- a record of your results
- a conclusion

For more information on Science Inquiry, Scientific Investigations and Safety refer to the Skills Handbook and Appendix A.

Chapter 1

Introduction to Earth Science

From space, the view of planet Earth consists of vast oceans and swirling clouds. ▶

CALIFORNIA Standards Preview

S 6.2 **Topography is reshaped by the weathering of rock and soil and by the transportation and deposition of sediment.**

S 6.3 **Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:**

a. Students know energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.

S 6.4 **Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept:**

a. Students know the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.

S 6.7 **Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:**

a. Develop a hypothesis.

b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data

c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.

f. Read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.