Florida Science
Grade 6

Consultant
Douglas Fisher, Ph.D.
About the Consultant

Douglas Fisher, Ph.D., is a Professor in the Department of Teacher Education at San Diego State University. He is the recipient of an International Reading Association Celebrate Literacy Award as well as a Christa McAuliffe award for Excellence in Teacher Education. He has published numerous articles on reading and literacy, differentiated instruction, and curriculum design as well as books, such as Improving Adolescent Literacy: Strategies at Work and Responsive Curriculum Design in Secondary Schools: Meeting the Diverse Needs of Students. He has taught a variety of courses in SDSU’s teacher-credentialing program as well as graduate-level courses on English language development and literacy. He also has taught classes in English, writing, and literacy development to secondary school students.
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Note-Taking Tips

Your notes are a reminder of what you learned in class. Taking good notes can help you succeed in science. These tips will help you take better notes.

• Be an active listener. Listen for important concepts. Pay attention to words, examples, and/or diagrams your teacher emphasizes.

• Write your notes as clearly and concisely as possible. The following symbols and abbreviations may be helpful in your note-taking.

<table>
<thead>
<tr>
<th>Word or Phrase</th>
<th>Symbol or Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>for example</td>
<td>e.g.</td>
</tr>
<tr>
<td>such as</td>
<td>i.e.</td>
</tr>
<tr>
<td>with</td>
<td>w/</td>
</tr>
<tr>
<td>without</td>
<td>w/o</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Word or Phrase</th>
<th>Symbol or Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>and</td>
<td>+</td>
</tr>
<tr>
<td>approximately</td>
<td>≈</td>
</tr>
<tr>
<td>therefore</td>
<td>∴</td>
</tr>
<tr>
<td>versus</td>
<td>vs</td>
</tr>
</tbody>
</table>

• Use a symbol such as a star (★) or an asterisk (*) to emphasis important concepts. Place a question mark (?) next to anything that you do not understand.

• Ask questions and participate in class discussion.

• Draw and label pictures or diagrams to help clarify a concept.

Note-Taking Don’ts

• Don’t write every word. Concentrate on the main ideas and concepts.

• Don’t use someone else’s notes—they may not make sense.

• Don’t doodle. It distracts you from listening actively.

• Don’t lose focus or you will become lost in your note-taking.
Before You Read
Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Ecology</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The biosphere is made up of all the ecosystems on Earth combined.</td>
<td></td>
</tr>
<tr>
<td>• Different species of organisms live in the same biome.</td>
<td></td>
</tr>
<tr>
<td>• Energy for most organisms comes from the Sun.</td>
<td></td>
</tr>
<tr>
<td>• A producer relies on prey for its food.</td>
<td></td>
</tr>
</tbody>
</table>

Ecology

Describe how fallen leaves and insects contribute to the survival of frogs in a system.

Fallen leaves provide food for insects and may provide some shelter or camouflage for frogs. Insects provide food for frogs.

Vocabulary Development

Vocabulary words help you to better understand your science lessons. Learning the Academic Glossary can help you score higher on standardized tests.
Identify some of the major ecosystems that make up the biosphere by completing the graphic organizer below.

- mountains
- deserts
- rivers
- oceans
- prairies
- forests
- wetlands

Section 1 What is an ecosystem? (continued)

Identify the four key needs of organisms and list them below.

1. food
2. shelter
3. protection
4. reproduction

Chapter Wrap-Up
This brings the information together for you. Revisiting what you thought at the beginning of the chapter provides another opportunity for you to discuss what you have learned.

Note-Taking Based on the Cornell Two-Column Format
Practice effective note-taking through the use of graphic organizers, outlines, and written summaries.

Review Checklist
This list helps you assess what you have learned and prepare for your chapter tests.

Graphic Organizers
A variety of visual organizers help you to analyze and summarize information and remember content.
Exploring and Classifying Life

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Exploring and Classifying Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All science takes place in laboratories.</td>
<td></td>
</tr>
<tr>
<td>• All of the changes that take place during an organism’s life are called responses.</td>
<td></td>
</tr>
<tr>
<td>• Spontaneous generation is the idea that living things come from nonliving things.</td>
<td></td>
</tr>
<tr>
<td>• Organisms are classified into groups based on their similarities.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List three characteristics that you would use to classify underwater life.

_________________________
_________________________
_________________________
_________________________
_________________________
_________________________
Scan the list below to preview Section 1 of your book.

- Read all section headings.
- Read all bold words.
- Read all charts and graphs.
- Think about what you already know about how to solve problems.

Write three facts you discovered about scientific methods as you scanned the section.

1. 
2. 
3. 

Write a paragraph describing scientific methods. Use all of the vocabulary words in your description. Underline each vocabulary word.

scientists use to solve problems. There are many scientific methods, but they often follow these steps. A scientist proposes a hypothesis. If the hypothesis is not supported by data, it is rejected. If the hypothesis is tested many times and is always accepted, it may become a scientific theory.
Define science using information from this section.

Sequence the steps scientists use to solve problems. Study the figure in your book, then close your book and try to fill in the figure. Check your work by looking back at your book.

Analyze the role of controls and variables in an experiment. Fill in the missing words.

A control is the ____________ to which the ____________ of a test is ____________. A variable is ________________ that can be ____________. The number of variables that should be changed during an experiment is ____________.
Contrast an opinion, a scientific theory, and a scientific law.

Complete the table.

<table>
<thead>
<tr>
<th></th>
<th>Opinion</th>
<th>Scientific Theory</th>
<th>Scientific Law</th>
</tr>
</thead>
<tbody>
<tr>
<td>What it is</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What it is based on</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize the metric units for each quantity below by listing them.

Length: __________________________

Volume: __________________________

Mass: ____________________________

Identify two important safety practices to follow in a laboratory.
1. _____________________________
2. _____________________________

A scientist collects data about ducks’ migration patterns every year between November and April. After 5 years, she draws conclusions and publishes a scientific paper. Describe the scientific methods she might have used. State why it was important to wait 5 years before publishing her results.
Exploring and Classifying Life
Section 2 Living Things

Benchmarks—SC.F.1.3.1: The student understands that living things are composed of major systems that function in reproduction, growth, maintenance, and regulation. Also covers: SC.F.1.3.2, SC.F.1.3.3, SC.F.1.3.5, SC.F.1.3.7, SC.G.1.3.5

Predict what you will learn in Section 2. Read the title and main headings. List three topics that you predict will be discussed in the section.

1. ________________________________
2. ________________________________
3. ________________________________

Use raw materials in a sentence to show its scientific meaning.

raw materials

Find a sentence in Section 2 that uses each vocabulary term.

organism

cell

homeostasis

Define respond using a dictionary. Then find a sentence in Section 2 that uses the term.

Definition: ________________________________
Sentence: ________________________________
Main Idea

**What are living things like?**

Organize the characteristics that define living things. Complete the graphic organizer.

Describe the relationship between a stimulus and a response. Complete the table. Then complete the flowchart to describe homeostasis.

### Table

<table>
<thead>
<tr>
<th>What It Is</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulus</td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td></td>
</tr>
</tbody>
</table>

### Flowchart

Homeostasis

- **Stimulus**
  - The conditions in an organism’s cells change.
- **Response**
Section 2 Living Things (continued)

**Main Idea**

Contrast the ways organisms obtain energy in the table.

<table>
<thead>
<tr>
<th>Organism</th>
<th>How It Obtains Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants</td>
<td></td>
</tr>
<tr>
<td>Animals</td>
<td></td>
</tr>
<tr>
<td>Bacteria in places sunlight cannot reach</td>
<td></td>
</tr>
</tbody>
</table>

Classify the needs of all living things. Complete the concept map.

**Details**

What do living things need?

Needs of Living Things

**Summarize It**

Choose one living thing and one nonliving thing with which you are familiar. Use the five characteristics of living things to explain how you know that each is living or nonliving. Complete the chart to organize your information.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Exploring and Classifying Life

Section 3 Where does life come from?

The student knows that scientific knowledge is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way. Also covers: SC.F.2.3.4, SC.H.1.3.2, SC.H.1.3.5, SC.H.1.3.6, SC.H.3.3.5

**Skim Section 3, and write three questions that you have.**

1. ______________________________________
2. ______________________________________
3. ______________________________________

**Review Vocabulary**

**Define** contaminate and use it in an original sentence.

- ______________________________________
- ______________________________________
- ______________________________________

**New Vocabulary**

**Write the vocabulary term that matches each definition.**

- ______________________________________
- ______________________________________

- the idea that living things come from nonliving things
- the idea that living things come only from other living things

**Academic Vocabulary**

**Use a dictionary to define estimate as both a noun and a verb.**

**Noun:** ______________________________________

____________________________________

**Verb:** ______________________________________

____________________________________
Contrast the theories of spontaneous generation and biogenesis. Complete the table.

<table>
<thead>
<tr>
<th>Spontaneous Generation</th>
<th>Biogenesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of life</td>
<td></td>
</tr>
</tbody>
</table>

Sequence experiments that were conducted about the theory of spontaneous generation. Complete the timeline.

- **1800s**
  - Who: __________________________
  - What: __________________________
- **1700s**
  - Who: __________________________
  - What: __________________________
- **1668**
  - Who: __________________________
  - What: __________________________

Complete key events in the evolution of life on Earth. Identify the event that scientists believe occurred at each time.

- about 5 billion years ago: __________________________
- about 4.6 billion years ago: __________________________
- more than 3.5 billion years ago: __________________________
Organize information about Oparin’s hypothesis. Complete the outline.

I. Oparin’s hypothesis of Earth’s early atmosphere composition
   A. ______________
   B. ______________
   C. ______________
   D. ______________

II. What happened in the atmosphere
   A. __________________________________
   B. __________________________________

Complete the graphic organizer summarizing Stanley Miller and Harold Urey’s experiment.

CONNECT IT
Scientists’ theories of the origin of life have changed over time. How do these changes show the use of scientific methods?

________________________
________________________
Read the What You’ll Learn statements for Section 4. Rewrite each statement as a question. As you read, look for the responses to your questions.

1. 
2. 
3. 
4. 

Describe how an organism’s common name is different from its scientific name.

common name


Read the definitions below. Write the vocabulary term that matches each definition.

- first and largest category used to classify organisms
- evolutionary history of an organism
- group of similar species
- two-word scientific naming system

Define similar using a dictionary.

similar


Section 4 How are living things classified? (continued)

**Main Idea**

**Classification**

I found this information on page __________.

**Details**

**Contrast** historic classification systems. Identify the categories or criteria used in each system.

<table>
<thead>
<tr>
<th>Categories or criteria</th>
<th>Early classification</th>
<th>Aristotle</th>
<th>Linnaeus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summarize** the 6 types of information that modern scientists use to determine an organism’s phylogeny.

1. __________
2. __________
3. __________
4. __________
5. __________
6. __________

**Label** the groups used to classify organisms from least specific to most specific. Use the word bank to complete the diagram.

class genus order species
family kingdom phylum

I found this information on page __________.

I found this information on page __________.

I found this information on page __________.
Summarize binomial nomenclature. Complete the sentences.

The first word of an organism’s scientific name is its ____________.
The second word might _________________________________.

Identify four reasons the system of binomial nomenclature is useful.
1. _______________________________________________________
   _______________________________________________________
2. _______________________________________________________
   _______________________________________________________
3. _______________________________________________________
   _______________________________________________________
4. _______________________________________________________
   _______________________________________________________

Distinguish between a field guide and a dichotomous key. Complete the Venn diagram.

Field Guide

Dichotomous Key

Both

SYNTHESIZE IT

Choose five similar plants or animals. Use what you know about their structures and features to develop your own dichotomous key to classify your choices. Use a dictionary to find the scientific name of each plant or animal to include in your key.
Exploring and Classifying Life
Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Exploring and Classifying Life</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All science takes place in laboratories.</td>
<td></td>
</tr>
<tr>
<td>• All of the changes that take place during an organism’s life are called responses.</td>
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<td>• Spontaneous generation is the idea that living things come from nonliving things.</td>
<td></td>
</tr>
<tr>
<td>• Organisms are classified into groups based on their similarities.</td>
<td></td>
</tr>
</tbody>
</table>

Review
Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT
After reading this chapter, identify three things you have learned.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

14 Exploring and Classifying Life
Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>The Living Cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bacteria are the smallest organisms on Earth.</td>
<td></td>
</tr>
<tr>
<td>• All living things are made up of one or more cells.</td>
<td></td>
</tr>
<tr>
<td>• Cells are organized into systems to perform functions that keep an organism alive.</td>
<td></td>
</tr>
<tr>
<td>• All bacteria are harmful.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

List features common to small, plastic building blocks. Predict whether plastic building blocks or cells have the greater number of features in common.
The Living Cell
Section 1 The World of Cells

Benchmarks—SC.F.1.3.2: The student knows that the structural basis of most organisms is the cell and most organisms are single cells, while some, including humans, are multicellular. Also covers: SC.F.1.3.5, SC.F.1.3.6, SC.G.1.3.1, SC.H.1.3.4

Skim through Section 1 of your text. Write two questions that come to mind.
1. 
2. 

Review Vocabulary
Use the term theory in a sentence to illustrate its scientific meaning.

theory

Define the following key terms using your book or a dictionary.
cell membrane

nucleus

mitochondria

photosynthesis

chloroplast

Academic Vocabulary
Use a dictionary to define exclude as a verb.

exclude
Summarize the three main ideas of the cell theory.

<table>
<thead>
<tr>
<th>Cell Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All living things are made up of one or more cells.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

Organize information you have learned about parts of a cell.

Parts of a cell

I. The outside of the cell

A. Cell membrane
   1. ________________________________
   2. ________________________________
   B. ________________________________ (plants only)
      supports and ________________________________

II. The inside of the cell

A. ________________________________
   1. gelatin-like substance
   2. ________________________________
   B. ________________________________
   1. ________________________________
      a. stores ________________________________ in chromosomes
      b. ________________________________
   2. Vacuoles store ________________________________
      ________________________________
      ________________________________, and ________________________________
   3. ________________________________ converts food energy into ________________________________
Main Idea

What are cells made of?

Model an animal cell. Use your book to help you sketch an animal cell and label its parts.
- cell membrane
- cytoplasm
- nucleus
- chromosomes
- mitochondrion
- vacuole

Details

Compare cellular respiration and photosynthesis. Label each input and output flow chart with these same five labels.
- carbon dioxide
- food
- energy
- oxygen
- water

Energy and the Cell

I found this information on page __________.

I found this information on page __________.

I found this information on page __________.
Skim the section. Read the headings and the figure captions. Predict three topics that might be discussed in this section.

1. 
2. 
3. 

Define organism using a dictionary.

organism

Read the definitions below. Write the key term on the blank in the left column.

———
group of similar cells that do the same type of work

———
different types of tissues working together

———
group of organs that works together to do a certain job

Use a dictionary to define function. Then use the term in a scientific sentence.

function
Main Idea

Special Cells for Special Jobs

<table>
<thead>
<tr>
<th>Type of Cell</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone</td>
<td>long and have many branches to send and receive messages quickly</td>
</tr>
<tr>
<td>Skin</td>
<td>provide protection against sun and disease</td>
</tr>
<tr>
<td>Fat</td>
<td>cells provide structure</td>
</tr>
</tbody>
</table>

Identify three functions of plant cells.
1. ___________________ 3. ___________________
2. ___________________

Compare and contrast human skin cells and the cells on the outside of a plant stem. Put the statements into the Venn diagram.

- cells are flat and close together
- part of the outer layer of the organism
- cells are short and thick
- provide protection against sun and disease
- cells provide structure

[Diagram of Venn diagram showing overlapping circles for Human Skin and Outer Plant Cells with Both and Neither sections shaded.]
Section 2 The Different Jobs of Cells (continued)

**Main Idea**

**Cell Organization**

*I found this information on page __________.*

**Details**

Complete the outline about cell organization.

Cell organization of many-celled organisms

**I. Tissues**

A. Definition: __________________________

B. Example: __________________________

**II. Organs**

A. Definition: __________________________

B. Example: __________________________

Specific examples of tissue systems

1. __________________________

2. __________________________

3. __________________________

**III. Organ systems**

A. Definition: __________________________

B. Example: __________________________

Specific examples of organs in system

1. __________________________

2. __________________________

3. __________________________

**CONNECT IT**

Create an analogy between the jobs of nerve cells and fat cells to real-life careers. For example, skin cells help protect the body, and police officers help protect people.
Scan Section 3 of your book. Write three facts that you discovered about bacteria, protists, and fungi as you scanned the section.

1. 

2. 

3. 

Define life cycle using your book or a dictionary.

life cycle

Read the definitions below. Write each vocabulary term on the blank in the left column.

- a process that is used to kill most harmful bacteria in a food product
- a one- or many-celled organism that lives in moist or wet surroundings
- a chemical that limits the growth of or kills other bacteria
- a one-celled, animal-like protist
- formed when a fungus and either a green alga or a cyanobacteriam live together
- plantlike protists

Use a dictionary to define sphere.

sphere
Section 3  Bacteria, Protists, and Fungi (continued)

Main Idea

Bacteria

I found this information on page __________.

Compare and contrast the ways that bacteria obtain food.

Model the three shapes of bacteria. Identify the shape and the special name of each one. Use the figure in your book to help you.

I found this information on page __________.

Summarize how bacteria can be harmful and healthful.

I found this information on page __________.
Main Idea

Protists

I found this information on page __________.

Details

Compare and contrast the three protist groups by inserting each characteristic listed below within the Venn diagram.

- consumers
- contain chlorophyll
- eukaryotic
- grouped by how they move
- live in wet surroundings
- producers
- saprophytes or parasites
- some have pseudopods

Summarize how protists can be harmful and helpful.

<table>
<thead>
<tr>
<th>Protists</th>
<th>Harmful Effects</th>
<th>Helpful Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
</tr>
<tr>
<td>2. Protists cause diseases such as malaria</td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>3. Algae produce oxygen.</td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td>4.</td>
</tr>
</tbody>
</table>
Organize information about fungi by completing these sentences.

1. Most fungi are ____________ and have ____________.
2. Most fungi are ____________, but some are ____________.
3. Fungi reproduce using structures called ____________.
4. Fungi are common in ____________.

Classify fungi by completing the graphic organizer below.

Types of Fungi

Examples

Examples

Examples

Examples

SYNTHESIZE IT

Write a short paragraph about how fungi that live in close association with other organisms help the environment.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
The Living Cell  Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>The Living Cell</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bacteria are the smallest organisms on Earth.</td>
<td></td>
</tr>
<tr>
<td>• All living things are made up of one or more cells.</td>
<td></td>
</tr>
<tr>
<td>• Cells are organized into systems to perform functions that keep an organism alive.</td>
<td></td>
</tr>
<tr>
<td>• All bacteria are harmful.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

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☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
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☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about cells.
The Role of Genes in Inheritance

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>The Role of Genes in Inheritance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Offspring always show the dominant traits of their parents.</td>
</tr>
<tr>
<td></td>
<td>• Some organisms can regrow parts of their bodies if these parts are lost.</td>
</tr>
<tr>
<td></td>
<td>• Traits are passed from one generation to the next.</td>
</tr>
<tr>
<td></td>
<td>• The environment cannot affect the way a person appears.</td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Write three traits of horses that you could trace from parents to offspring.
The Role of Genes in Inheritance

Section 1 Continuing Life

Skim the headings, illustrations, and charts in Section 1. Write three concepts that you predict this section will describe.

1. 

2. 

3. 

Review Vocabulary

Define chromosome to show its scientific meaning.

chromosome ________________________________

New Vocabulary

Write sentences that contain both terms in each pair.

asexual reproduction/mitosis ________________________________

DNA/cloning ________________________________

sexual reproduction/fertilization ________________________________

meiosis/sex cells ________________________________

Academic Vocabulary

Use your book or a dictionary to define the term identical.

identical ________________________________
Main Idea

Reproduction

State two reasons that reproduction is important.
1. _____________________________
   _____________________________
2. _____________________________
   _____________________________

Details

Complete the following paragraph.

___________ is in all cells. It is shaped like a
___________ . The sides support the steps, or rungs, of the ladder. Each rung is made up of
___________ . There are __________ bases, and they pair __________. The order of the bases forms a __________ that provides the cell with __________ about what materials to make, how to make them, and when to make them.

Cell Division

Model the steps of mitosis and cell division, beginning with a cell that has four chromosomes. Then complete the caption below.

______________________________

______________________________

In a plant or animal cell, cell division results in __________
and the __________ of aging or __________ cells.
Complete the information below about some important processes that rely on cell division.

Some organisms can replace body parts that have been lost.

Budding: A copy of the original organism is made.

Organize the information about sex cells by completing the outline.

I. Types of human sex cells
   A. __________________________: sperm
   B. __________________________: __________________________

II. Production of sex cells
   A. Sex cells are formed through __________________________.
   B. Sex cells have ________________ the genetic information of __________________________.

III. Sex cells in flowering plants
   A. After sperm and egg join, __________________________
      __________________________.
   B. A ________________ that contains ________________ may then develop.

SYNTHESIZE IT

Describe why it is important that sex cells are produced by meiosis and not by mitosis.
The Role of Genes in Inheritance

Section 2 Genetics—The Study of Inheritance

Benchmarks—SC.F.2.3.2: The student knows that the variation in each species is due to the exchange and interaction of genetic information as it is passed from parent to offspring. Also covers: SC.H.1.3.3, SC.H.1.3.5, SC.H.1.3.6, SC.H.1.3.7, SC.H.2.3.1, SC.H.3.3.1

Scan Section 2. Read all of the section headings and bold terms. Write two facts that you discovered about genetics as you scanned the section.

1. 
2. 

Define the term genotype to show its scientific meaning.

The Role of Genes in Inheritance

Genotype

Write the correct vocabulary word next to each definition.

- passing of traits from parents to offspring
- study of how traits are passed from parents to offspring
- small section of DNA on a chromosome that has information about a trait
- different way that a certain trait appears that results from permanent changes in an organism’s genes
- change in a gene or chromosome

Define feature as it is used in the following sentence.

Eye color, nose shape, and other features are traits that are inherited from one’s parents.
Main Idea

Heredity
I found this information on page _________.

Details

Synthesize information about heredity by describing how traits are passed from parent to offspring.

Analyze hybrid and pure traits by filling in the blanks.
Each gene of a gene pair is called a(n) _____________. If a gene pair contains different ______________ for a trait, that trait is called a(n) ______________. If a gene pair contains identical ______________ for a trait, that trait is called ______________.

Identify whether the dominant or recessive form of the trait will be expressed in each case.

<table>
<thead>
<tr>
<th>Alleles</th>
<th>Form of the Trait Expressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>two dominant alleles</td>
<td></td>
</tr>
<tr>
<td>one dominant allele, one recessive allele</td>
<td></td>
</tr>
<tr>
<td>two recessive alleles</td>
<td></td>
</tr>
</tbody>
</table>

Summarize how environment can affect the expression of traits.

I found this information on page _________.

I found this information on page _________.

I found this information on page _________.

I found this information on page _________.

Section 2 Genetics—The Study of Inheritance (continued)

The Role of Genes in Inheritance
Main Idea

Passing Traits to Offspring

I found this information on page __________.

Details

Analyze how a hybrid purple-flowered plant and a white-flowered plant can produce a purple-flowered plant. Fill in the correct allele(s) in each cell below.

<table>
<thead>
<tr>
<th>Purple-flowered parent plant sex cells</th>
<th>Offspring cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-flowered parent plant sex cells</td>
<td></td>
</tr>
</tbody>
</table>

Complete the table that shows causes of variation in a species.

<table>
<thead>
<tr>
<th>Description</th>
<th>Example(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple alleles</td>
<td>There are more than two alleles for a trait in a population.</td>
</tr>
<tr>
<td>Multiple genes</td>
<td></td>
</tr>
<tr>
<td>Mutations</td>
<td>four-leaf clover</td>
</tr>
</tbody>
</table>

Synthesize It

The allele that codes for the presence of dimples is a dominant allele. Explain why a girl might not have dimples even though both her parents have dimples.
The Role of Genes in Inheritance

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
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<table>
<thead>
<tr>
<th>The Role of Genes in Inheritance</th>
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☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things you have learned about the role of genes in inheritance.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

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Sunshine State Standards—SC.F.1: The student describes patterns of structure and function in living things.

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Support, Movement, and Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Your skin is the largest organ of your body.</td>
<td></td>
</tr>
<tr>
<td>• No matter how still you might be, some muscles in your body are always moving.</td>
<td></td>
</tr>
<tr>
<td>• Living bone is an organ made of several different tissues.</td>
<td></td>
</tr>
<tr>
<td>• The basic working units of the nervous system are nerve cells.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

**Science Journal**

Imagine for a moment that your body does not have a support system. How will you perform your daily activities? Explain your reasoning.

---

Name __________________________ Date _____________

Support, Movement, and Responses
Support, Movement, and Responses

Section 1  The Skin

Scan the section by following the checklist below.

☐ Read all of the section headings.
☐ Read all of the bold words.
☐ Read all charts and graphs.
☐ Look at all of the pictures.
☐ Think about what you already know about the skin.

Write three facts that you discovered about the skin as you scanned this section.

1. 
2. 
3. 

Define organ as it relates to the body, and use it in an original sentence.

organ

Use your book to define the following terms.

epidermis

melanin

Use a dictionary to define regulate.

regulate
Section 1 The Skin (continued)

Main Idea

Skin Structures
I found this information on page _________.

Details

Model the skin by drawing and labeling its parts.

Skin Functions
I found this information on page _________.

Create a graphic organizer to identify the five major functions of the skin.
Skin Injuries and Repair

Complete the graphic organizer to identify types of skin injuries.

Types of Skin Injuries

1. Damage from exposure to harsh conditions

Sequence the steps involved in the formation of a bruise and its healing.

1. Red blood cells leak into tissue and release hemoglobin.

2.

3.

4.

5.

6.
Support, Movement, and Responses
Section 2 The Muscular System

Scan the headings in Section 2. Read the headings and examine the illustrations. Write three questions that come to mind.
1. ______________________________________
2. ______________________________________
3. ______________________________________

Review Vocabulary

Use your book or a dictionary to define muscle.

muscle

________________________________________

________________________________________

New Vocabulary

Use your book to define the following terms. Then write a sentence for each term.

voluntary muscle

________________________________________

________________________________________

________________________________________

involuntary muscle

________________________________________

________________________________________

________________________________________

tendon

________________________________________

________________________________________

________________________________________

Academic Vocabulary

Use a dictionary to define voluntary.

voluntary

________________________________________

________________________________________

________________________________________
Compare and contrast movements of voluntary and involuntary muscles by using the terms provided to complete the Venn diagram.

- able to relax
- controlled consciously
- able to contract
- cannot control consciously
- provides force for movement
- face muscle
- stomach muscle

Voluntary Muscle

Involuntary Muscle

Classify the types of muscle tissues in the graphic organizer.

Types of Muscle Tissues

- Striated
- Nonstriated
Muscles work together in ___________ so that your body can move. As one muscle ____________, the other ____________. Muscles ___________ push; they always ____________.

When the muscles on the back of your upper leg contract, they ____________ and pull your lower leg back and up. When you straighten your leg, the muscles on the back of your upper leg ____________ and lengthen, and the muscles on the front of your upper leg ____________.

**Analyze** how energy is changed during the contraction of muscle by completing the graphic organizer below.

- Stored energy changes to ____________ energy and ____________ energy.
- Muscle ____________ and produces ____________.

**SYNTHESIZE IT**

Explain why a runner may have difficulty walking steadily after a long race.
Support, Movement, and Responses
Section 3 The Skeletal System

Benchmarks—SC.F.1.3.1: The student understands that living things are composed of major systems that function in reproduction, growth, maintenance, and regulation. Also covers: SC.1.3.2, SC.F.1.3.3, SC.F.1.3.4, SC.F.1.3.6

Predict three things that will be discussed in Section 3. Read the section’s headings to help you make your predictions.
1. ________________________________
2. ________________________________
3. ________________________________

Define skeleton.
skeleton

Find a sentence in Section 3 that includes each vocabulary term.
periosteum

cartilage

joint

ligament

Use a dictionary to define internal.
internal
Section 3 The Skeletal System (continued)

Main Idea

Functions of Your Skeletal System

I found this information on page __________.

Bone Structure

I found this information on page __________.

Details

Summarize the functions of the skeletal system on the lines below.
1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________
5. ____________________________

Distinguish compact bone from spongy bone by identifying a characteristic and the importance of each type of bone.

<table>
<thead>
<tr>
<th>Type of Bone</th>
<th>Characteristic</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Create a graphic organizer to identify five characteristics of cartilage that make it important in joints.

I found this information on page __________.
Section 3 The Skeletal System (continued)

Main Idea

Bone Formation
I found this information on page __________.

Details

**Compare** the roles of osteoblasts and osteoclasts in the formation and breakdown of bone tissue.

Osteoblasts

Osteoclasts

Joints
I found this information on page __________.

**Organize** the different types of joints in a graphic organizer.

Your Body’s Simple Machines–Levers
I found this information on page __________.

**Model** the three types of levers found in the body by providing simple drawings to illustrate the positions of the fulcrum, effort force, and load in each type.

- first-class lever
- second-class lever
- third-class lever
Support, Movement, and Responses
Section 4 The Nervous System

Benchmarks—SC.F.1.3.1: The student understands that living things are composed of major systems that function in reproduction, growth, maintenance, and regulation. Also covers: SC.F.1.3.4, SC.F.1.3.5, SC.F.1.3.6, SC.F.1.3.7, SC.H.1.3.2, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.6, SC.H.2.3.1

Scan the headings in Section 3 to identify the body’s senses.

1. __________________________________________

2. __________________________________________

3. __________________________________________

4. __________________________________________

5. __________________________________________

Define homeostasis.

homeostasis

____________________________________________

____________________________________________

Scan within the section for bold words and their meanings. Then write the correct term next to its definition.

nerve cell

____________________________________________

small space in which an impulse crosses from one neuron to another

____________________________________________

brain and spinal cord

____________________________________________

all of the nerves that connect the brain and spinal cord to other body parts

Use a dictionary to define adjust.

adjust

____________________________________________

____________________________________________
Complete the graphic organizer below to illustrate how the nervous system acts as a control system for the body.

Sequence the structures of a neuron in the order in which an impulse travels.

1. ________________  2. ________________  3. ________________

Organize the parts of the nervous system in this graphic organizer.
Sequence the reflex arc by tracing the path of an impulse, for example after a person touches a hot object.

- skin receptor
- 
- 
- muscle contracts

Identify the sensory organs and their receptors for each sense.

<table>
<thead>
<tr>
<th>Sense</th>
<th>Sensory Organ</th>
<th>Sensory Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize the effects of depressants and stimulants on the body.

1. Depressants

2. Stimulants

CONNECT IT
Evaluate how alcohol use could affect the ability of a person riding a bicycle.
Support, Movement, and Responses
Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an **A** if you agree with the statement.
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<th><strong>Support, Movement, and Responses</strong></th>
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- Look over the Chapter Review at the end of the chapter.

**Summarize It**

Identify three things that you learned about body systems.

---

48  Support, Movement, and Responses
Before You Read

Preview the chapter title, the section titles, and the section headings. List at least one idea for each section in each column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
<th>W</th>
<th>What I want to find out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Write a paragraph describing what you do to help your body recover after an active game.

________________________
________________________
________________________
________________________
________________________
________________________
Scan the title and headings in Section 1. Predict three topics that might be discussed in this section.

1. ________________________________
2. ________________________________
3. ________________________________

Write an original sentence to show the scientific meaning of the word bacteria.

bacteria

Find a sentence in Section 1 that uses each vocabulary term or a form of the term.

nutrient

enzyme

peristalsis

chyme

villi

Use a dictionary to define chemical as an adjective.
Main Idea

Functions of the Digestive System

I found this information on page _________.

Details

Sequence the steps of the digestive process. Identify what occurs during each step.

Step:  
What happens:  

Step: Digestion  
What happens:  
Chemical:  
Mechanical:  

Step:  
What happens:  

Step:  
What happens:  

Summarize how enzymes are important by completing the statements below.

Enzymes and help you digest .  

They are produced in .

Enzymes also are important because they and .
Model and label the organs involved in digestion. Circle the labels of organs that are part of the digestive tract.

Identify two ways bacteria in the digestive system help the body.

1. __________________________________________________________________________

2. __________________________________________________________________________

Suppose you eat a sandwich that provides protein, carbohydrates, and fat. Describe what happens to the sandwich as it moves through your digestive system.
Digestion, Respiration, and Excretion

Section 2 Nutrition

Benchmarks—SC.F.1.3.5: The student explains how the life functions of organisms are related to what occurs within the cell; SC.H.2.3.1: The student recognizes that patterns exist within and across systems.

Scan the illustrations in Section 2. Write three questions that come to mind. As you read, look for answers to your questions.

1. 
2. 
3. 

Define molecule to show its scientific meaning.

molecule

New Vocabulary

Use your book to define the following terms.

amino acid

carbohydrate

vitamin

mineral

Academic Vocabulary

Use a dictionary to define source. Then write an original sentence using the term.

source

Digestion, Respiration, and Excretion 53
Complete the paragraph to summarize the importance of food.

Food provides _________________________________.

The ________________________ of food is its most important quality, but many people choose food based on
__________________________ and _______________________.

Identify the 6 major classes of nutrients.
1. __________ 3. __________ 5. __________
2. __________ 4. __________ 6. __________

Summarize why proteins are important nutrients.

______________________________________________

Organize information about the 3 types of carbohydrates.

<table>
<thead>
<tr>
<th>Type</th>
<th>Food Sources</th>
<th>Use in Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize four functions that fat has in the body.
1. _________________________________________
2. _________________________________________
3. _________________________________________
4. _________________________________________
Distinguish between water-soluble and fat-soluble vitamins.

<table>
<thead>
<tr>
<th>Water-Soluble Vitamins</th>
<th>Fat-Soluble Vitamins</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Label each description with the mineral it describes.

___________ helps clot blood and maintain strong teeth and bones.

___________ helps muscle contraction.

___________ allows oxygen to be transported by red blood cells.

Model serving sizes for different food categories.

<table>
<thead>
<tr>
<th>Group</th>
<th>Recommended Servings per Day</th>
<th>Examples of 1 Serving Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread and cereal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk, yogurt, or cheese</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat, beans, and eggs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connect It

Plan a daily menu that provides the recommended servings from each food group. Identify some nutrients that each food in your menu provides.
Digestion, Respiration, and Excretion

Section 3 The Respiratory System

Scan Section 3 using the checklist below.

☐ Read all headings.
☐ Read all bold words.
☐ Look at each illustration.
☐ Think about what you already know about breathing.

Write two predictions you have for subjects that will be covered in this section.

1. ____________________________________________________________________

2. ____________________________________________________________________

Define diaphragm as it relates to the respiratory system.

diaphragm

________________________________________________________________________

________________________________________________________________________

Write the vocabulary term that matches each definition.

tiny, thin-walled sacs at the end of bronchioles

________________________________________________________________________

air-conducting tube that connects the larynx with the bronchi

________________________________________________________________________

airway to which the vocal cords are attached

________________________________________________________________________

two short tubes that carry air into the lungs

________________________________________________________________________

Read the sentence below. Analyze what coordinate means in this sentence.

Your brain coordinates the movement of the muscles in your throat, tongue, cheeks, and lips when you talk.

coordinate
Sequence the process of breathing and cellular respiration.

Breathing in brings oxygen into the body.

Blood ________________________________.

Cells ________________________________.

Cells produce carbon dioxide and water as waste.

Blood ________________________________.

Breathing out ________________________________.

Create a drawing of the respiratory system. Label the nasal cavity, larynx, pharynx, trachea, lungs, bronchi, and alveoli. Write a caption explaining the function of each part of the system.
Analyze how carbon dioxide in the blood affects breathing rate.

Model the role of the diaphragm in breathing. Make one diagram of the lungs and diaphragm for when a person inhales and one for exhaling. Use arrows to show how the lungs and diaphragm move.

Classify respiratory diseases and disorders. Complete the table.

<table>
<thead>
<tr>
<th>Disease or Disorder</th>
<th>Cause or Contributing Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory infections</td>
<td></td>
</tr>
<tr>
<td>Chronic bronchitis</td>
<td></td>
</tr>
<tr>
<td>Lung cancer</td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td></td>
</tr>
</tbody>
</table>

Describe how emphysema affects cellular respiration and cell function.
Digestion, Respiration, and Excretion

Section 4 The Excretory System

Read the What You’ll Learn statements for Section 4. Rewrite each statement as a question. As you read, look for the answers to your questions.

1.

2.

3.

Define capillary to show its scientific meaning.

Use your book to define the following terms.

nephron

ureter

bladder

Use a dictionary to define eliminate. Then rewrite the following sentence, substituting the meaning you found for the word eliminate.

You eliminate some salts when you sweat.

eliminate
**Main Idea**

**Functions of the Excretory System**

I found this information on page __________.

**Details**

**Summarize** the ways in which the body excretes, or removes, waste. Complete the table to show what each body system excretes.

<table>
<thead>
<tr>
<th>Excretion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digestive System</td>
</tr>
<tr>
<td>Skin</td>
</tr>
</tbody>
</table>

**Analyze** the importance of excretion by completing the sentence.

If the body did not excrete wastes, ____________________________

**Summarize** the function of each part of the urinary system.

- **Kidneys:** ____________________________
- **Renal arteries:** ____________________________
- **Renal veins:** ____________________________
- **Ureters:** ____________________________
- **Bladder:** ____________________________
- **Urethra:** ____________________________
### Main Idea

*Identify some effects of excretory system malfunction.*

### Details

**Sequence the steps of filtration in the kidneys.**

1. Blood enters the kidneys through the renal artery.

2. 

3. 

4. 

5. 

6. The liquid left behind flows into collecting tubules and then into ureters.

### Urinary Diseases and Disorders

*Identify the effects of kidney failure.*

I found this information on page _________.

### SYNTHESIZE IT

Identify some effects of excretory system malfunction.
Digestion, Respiration, and Excretion
Chapter Wrap-Up

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column. How do your ideas compare with those you provided at the beginning of the chapter?

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I know</td>
<td>What I want to find out</td>
<td>What I learned</td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.

☐ Study your Science Notebook on this chapter.

☐ Study the definitions of vocabulary words.

☐ Review daily homework assignments.

☐ Re-read the chapter and review the charts, graphs, and illustrations.

☐ Review the Self Check at the end of each section.

☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

Identify the three most important ideas from this chapter.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Circulation and Immunity

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Circulation and Immunity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• All blood cells are the same.</td>
</tr>
<tr>
<td></td>
<td>• Your heart is an organ made of muscle tissue.</td>
</tr>
<tr>
<td></td>
<td>• White blood cells help your body fight disease.</td>
</tr>
<tr>
<td></td>
<td>• Washing a small wound with soap and water is helpful in preventing an infection.</td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Write three questions you have about blood, circulation, or how diseases are spread.
Circulation and Immunity

Section 1 Blood

Scan Section 1 of your book. Write two facts you discovered about blood while scanning the section.

1. __________________________________________________________

2. __________________________________________________________

New Vocabulary

Define diffusion to show its scientific meaning.

diffusion

______________________________________________________________

______________________________________________________________

______________________________________________________________

Use your book or a dictionary to define the following terms.

plasma

______________________________________________________________

______________________________________________________________

hemoglobin

______________________________________________________________

______________________________________________________________

platelet

______________________________________________________________

______________________________________________________________

Academic Vocabulary

Use a dictionary to define the term factor. Find a sentence in the section in which the word is used and write the sentence below.

factor

Definition: ______________________________________________________

______________________________________________________________

Sentence: ______________________________________________________

______________________________________________________________

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Main Idea

Functions of Blood

I found this information on page __________.

Parts of Blood

I found this information on page __________.

Blood Clotting

I found this information on page __________.

Organize information about the functions of blood by completing the graphic organizer.

Compare the parts of blood by completing the chart.

<table>
<thead>
<tr>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma</td>
<td></td>
</tr>
<tr>
<td>Red blood cells</td>
<td></td>
</tr>
<tr>
<td>White blood cells</td>
<td></td>
</tr>
<tr>
<td>Platelets</td>
<td></td>
</tr>
</tbody>
</table>

Sequence events that happen as a cut begins to heal.

Platelets stick to the wound and release chemicals.

---

Circulation and Immunity 65
-blood transfusion. She has type AB₂ blood.
You have type O₁ blood. Can you donate blood to her? Explain.
Circulation and Immunity

Section 2 Circulation

Benchmarks—SC.H.2.3.1: The student recognizes that patterns exist within and across systems.
Also covers: SC.F.1.3.1, SC.F.1.3.4

Preview Section 2 by reading the What You’ll Learn statements. Rewrite them as questions. Answer these questions as you read.

1. ______________________________________
2. ______________________________________
3. ______________________________________
4. ______________________________________

Define tissue using its scientific meaning.

Match the correct vocabulary term with its definition.

blood vessel that connects arteries and veins
blood vessel that carries blood away from the heart
blood vessel that carries blood to the heart
fluid that has diffused into the lymphatic capillaries

Use a dictionary to define the term constant as it is used in the following sentence.

This message from the brain helps keep blood pressure constant within your arteries so that enough blood reaches all organs and tissues in your body.

constant
The Heart

I found this information on page ________

Complete the paragraph describing the heart.

The heart is a(n) _________ made of ___________ tissue.

It is located behind the _________ and between the _________.

The heart has _____________. The upper chambers are called the ____________ and _____________. The lower chambers are called the ____________ and _____________.

Blood Vessels

I found this information on page ________

Compare blood vessels by describing them in the table below.

<table>
<thead>
<tr>
<th>Vessel</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arteries</td>
<td></td>
</tr>
<tr>
<td>Veins</td>
<td></td>
</tr>
<tr>
<td>Capillaries</td>
<td></td>
</tr>
</tbody>
</table>

Types of Blood Vessels

Label the diagram, and add arrows to trace the flow of blood between the heart, lungs, and body.

left side of heart

right side of heart
Section 2 Circulation (continued)

**Main Idea**

**Blood Pressure**
*I found this information on page ________.*

**Cardiovascular Disease**
*I found this information on page ________.*

**Functions of the Lymphatic System**
*I found this information on page ________.*

**Details**

**Summarize** how blood pressure is maintained by the body.

**Organize** information about cardiovascular disease in the chart.

<table>
<thead>
<tr>
<th>Cardiovascular disease</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease</td>
<td>Atherosclerosis</td>
</tr>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Effect</td>
<td></td>
</tr>
</tbody>
</table>

**Model** the pathway of fluid through the circulatory and lymphatic systems by completing the cycle chart below.

- Water and other substances leave capillaries and become __________.
- Filtered fluids reenter bloodstream through large __________ near neck.
- Fluid diffuses into __________.
- It is now called __________.
- ________ filter out materials collected by __________.

**CONNECT IT**
Identify habits that may decrease or increase your chances of developing atherosclerosis and hypertension.

---

Circulation and Immunity 69
Circulation and Immunity

Section 3 Immunity

Benchmarks—SC.F.1.3.6: The student knows that the cells with similar functions have similar structures, whereas those with different structures have different functions. Also covers: SC.F.1.3.1, SC.F.1.3.6, SC.H.2.3.1

Skim through Section 3 of this chapter. Identify two things you think you will learn in this section.

1. ____________________________
2. ____________________________

Review Vocabulary

Define the word enzyme using its scientific meaning.

enzyme

New Vocabulary

Use your book or a dictionary to define the new vocabulary terms.

passive immunity

antibody

active immunity

antigen

Academic Vocabulary

Use a dictionary to define the word passive using its scientific meaning. Write a sentence from your book that uses the word.

passive

Definition: _________________________________

______________________________

Sentence: ________________________________

______________________________
Main Idea

Lines of Defense

Organize information about the body’s first-line defenses against disease.

Details

I found this information on page _________.

Summarize two ways your skin protects you from disease.

1. _______________________________________________________________________

2. _______________________________________________________________________

Compare and contrast characteristics of the three systems of internal first-line defenses.

<table>
<thead>
<tr>
<th>Internal First-line Defenses</th>
<th>Respiratory System</th>
<th>Digestive System</th>
<th>Circulatory System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A woman had chicken pox when she was a child. Explain how this affects her susceptibility to chicken pox as an adult.
Circulation and Immunity
Section 4 Diseases

Benchmarks—SC.G.1.3.1: The student knows that viruses depend on other living things. Also covers: SC.H.1.3.1, SC.H.1.3.2, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.6, SC.H.3.3.5

Skim Section 4 and predict four topics that you will study in this section.
1. ___________________________________________________________________
2. ___________________________________________________________________
3. ___________________________________________________________________
4. ___________________________________________________________________

Review Vocabulary

Define virus using its scientific meaning.
virus

New Vocabulary

Write the correct vocabulary term next to its definition.

process in which a liquid is heated to a temperature that kills most bacteria

_________________________________________________________________

disease caused by a virus, bacterium, fungus, or protist that is spread from one person to another

_________________________________________________________________

disease that is not caused by a pathogen

_________________________________________________________________

substance that causes an allergic reaction

_________________________________________________________________

Academic Vocabulary

Use a dictionary to define the word enable. Rewrite the following sentence, substituting the new meaning.

Insulin is a hormone that enables glucose to pass from the bloodstream into your cells.

enable

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

Name ___________________________ Date _______________

Circulation and Immunity 73
Summarize *the discoveries about disease made by these scientists.*

**Louis Pasteur:**

**Robert Koch:**

**Joseph Lister:**

Organize *information on the ways infectious diseases can spread.*

Complete *the following paragraph about AIDS.*

HIV attacks the _____________ in the immune system. The virus enters the T cell and _____________. When the infected cell _____________, it releases more _____________. These infect other _____________. Soon, _____________ cannot produce _____________. The immune system is unable to fight HIV or any other _____________.

---

**Main Idea**

**Disease in History**

*I found this information on page ____________.*

**Infectious Diseases**

*I found this information on page ____________.*

**HIV and Your Immune System**

*I found this information on page ____________.*
Organize information by listing five ways to prevent infection.

1. 
2. 
3. 
4. 
5. 

Summarize the characteristics of allergies and diabetes.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Allergies</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effect</th>
<th>Allergies</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Circulation and Immunity  Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Circulation and Immunity</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All blood cells are the same.</td>
<td></td>
</tr>
<tr>
<td>• Your heart is an organ made of muscle tissue.</td>
<td></td>
</tr>
<tr>
<td>• White blood cells help your body fight disease.</td>
<td></td>
</tr>
<tr>
<td>• Washing a small wound with soap and water is helpful in preventing an infection.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

- Review the information you included in your Foldable.
- Study your Science Notebook on this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Re-read the chapter and review the charts, graphs, and illustrations.
- Review the Self Check at the end of each section.
- Look over the Chapter Review at the end of the chapter.

Summarize It

After reading this chapter, identify three things you have learned about circulation and immunity.


Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Ecology</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The biosphere is made up of all of the ecosystems on Earth combined.</td>
<td></td>
</tr>
<tr>
<td>• Different species of organisms live in the same habitat.</td>
<td></td>
</tr>
<tr>
<td>• Energy for most organisms comes from the Sun.</td>
<td></td>
</tr>
<tr>
<td>• A producer relies on prey for its energy.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Describe how fallen leaves and insects contribute to the survival of frogs in a system.
Ski m Section 1. Predi c t three things that might be discussed in this section.

1. 

2. 

3. 

Review Vocabulary Define organism to show its scientific meaning.

organism 

New Vocabulary Use your book to define the following key terms.

ecosystem 

ecology 

biotic factors 

abiotic factors 

Academic Vocabulary Use a dictionary to define interact to show its scientific meaning.

interact 

Name ___________________________ Date ____________________
Section 1  What is an ecosystem? (continued)

**Main Idea**

**Ecosystems**

I found this information on page _____.

**Details**

Identify some of the major ecosystems that make up the biosphere by completing the graphic organizer below.

Identify the four key needs of organisms and list them below.

<table>
<thead>
<tr>
<th>Key Needs of Organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
</tbody>
</table>
Section 1  What is an ecosystem? (continued)

**Main Idea**

**Nonliving Parts of Ecosystems**

Organize information about the four nonliving parts of ecosystems. Fill in the chart below, identifying and describing each.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Soil</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
</tbody>
</table>

**Details**

Summarize the ways a hurricane may change an ecosystem by completing the diagram below.

**A Balanced System**

I found this information on page __________.

**CONNECT IT**

A fire sweeps through a forest ecosystem. Describe a destructive effect and a beneficial effect that may result.

---

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Ecology
Section 2 Relationships Among Living Things

Benchmarks—SC.H.2.3.1: The student recognizes that patterns exist within and across systems.
Also covers: SC.1.3.2, SC.G.2.3.3

Skim Section 2 of your text. Write three questions that come to mind as you read the headings and examine the illustrations.

1. 
2. 
3. 

Define the following terms to show their scientific meanings.

adaptation

population

community

limiting factor

niche

habitat

Use a dictionary to define decline to show its scientific meaning.

decline
Complete the Venn diagram below to represent the relationship between a population and a community.

Summarize the characteristics of populations that are studied by ecologists. Complete the sentence.

The characteristics of a population include the size of the population, ____________________________, and ____________________________.

Sequence the steps in the mark and recapture method of studying populations by completing the flow chart below.

Populations can also be studied by:
1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________
Complete the graphic organizer below with some of the resources for which organisms compete.

**Limits to Populations**

*Complete the graphic organizer below with some of the resources for which organisms compete.*

Analyze the niches of snails, fish, and algae in an aquarium. Describe how each organism interacts with the other organisms and the environment.

**Where and How Organisms Live**

I found this information on page ________.

**CONNECT IT**

Describe how carpenter ants might both use resources and serve as a resource in the habitat of an apple tree.
Ecology

Section 3 Energy Through the Ecosystem

Scan the headings in Section 3 of your book. Identify four topics that will be discussed.

1. 
2. 
3. 
4. 

Review Vocabulary

Define recycling to show its scientific meaning.

recycling

New Vocabulary

Use your book to define the following terms. Then use each term in a sentence to show its scientific meaning.

producer

predator

prey

decomposer

Academic Vocabulary

Use a dictionary to define sequence to show its scientific meaning.

sequence
Section 3 Energy Through the Ecosystem (continued)

Main Idea

The Flow of Energy

Organize the following to show relationships to one another in the flow of energy.

- grasshopper
- sunlight
- insect-eating bird
- grass

Flow of Energy

Summarize what happens to available energy as it is transferred through the food web.

Because the transfer of energy is ________ 100% efficient, the amount of available energy ________ at each feeding level in the food web.

Interactions in Communities

Complete the table by providing an example of each type of interaction.

<table>
<thead>
<tr>
<th>Relationships Among Organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Interaction</strong></td>
</tr>
<tr>
<td>Both organisms benefit.</td>
</tr>
<tr>
<td>Only one organism benefits.</td>
</tr>
<tr>
<td>One organism benefits, and the other is harmed.</td>
</tr>
</tbody>
</table>
Modeling the Flow of Energy

Model an ocean food web involving the following: the Sun, penguin, krill, whale, orca, plankton, fish, seal, and squid.

Cycling of Materials

Complete the diagram to show the relationship of consumers, producers, and decomposers to each other in cycling materials through an ecosystem.

Describe the importance of decomposers in an ecosystem.
Tie It Together

Make a Food Web

With a partner, describe a habitat near where you live. Identify as many organisms as you can that share the habitat. Create a food web that shows the flow of energy through the habitat, and then change a biotic factor in the habitat. Describe the effect this change would have on the food web.
After reading this chapter, identify three things that you have learned about ecology.
Before You Read

Think about the terms and descriptions below. Infer which term most closely matches the description and write it on the line.

<table>
<thead>
<tr>
<th>biome</th>
<th>ecosystem</th>
<th>estuary</th>
<th>intertidal zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>community of living organisms interacting with each other and their physical environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>part of the shoreline that is under water at high tide and exposed to the air at low tide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a large geographic area with an interactive environmental community and similar climate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>extremely fertile area where a river meets an ocean; contains a mixture of freshwater and saltwater and serves as a nursery for many species</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

What traits might plants on a burning hillside have that enable them to survive?

---

Sunshine State Standards—SC.D.1: The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth. Also covers: SC.D.2, SC.G.2, SC.H.2.
Ecosystems
Section 1 How Ecosystems Change

Skim through Section 1 of your text. Write three things that might be discussed in this section.

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

Define the following key terms to show their scientific meanings.

ecosystem

____________________________

climax community

____________________________

pioneer species

____________________________

succession

____________________________

stable

____________________________
Section 1 How Ecosystems Change (continued)

Main Idea

Ecological Succession

I found this information on page _________.

Details

Sequence the steps in the succession of a lawn to a climax community. The first one has been completed for you.

<table>
<thead>
<tr>
<th>Succession of a Lawn to Climax Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The grass would get longer.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

Organize information to compare primary succession with secondary succession.

<table>
<thead>
<tr>
<th></th>
<th>Primary Succession</th>
<th>Secondary Succession</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lava from a volcano</td>
<td></td>
<td>Fire consumes a forest</td>
</tr>
</tbody>
</table>

- Land consists of
- Starts with
- Soil contains
- Animals and wind carry
- Plants add
- Wildlife
Complete the graphic organizer to better understand the characteristics of a climax community.

A climax community

is

is

has reached

Identify the three main characteristics of a forest climax community.
1. 
2. 
3. 

CONNECT IT

Predict the growth of a community in a flooded river basin.
Hypothesize whether the succession would be primary succession or secondary succession. Support your answer with facts from your book.
Ecosystems
Section 2 Biomes

Benchmarks—SC.D.2.3.2: The student knows the positive and negative consequences of human action on the Earth’s systems. Also covers: SC.G.2.3.2, SC.G.2.3.4, SC.H.1.3.1, SC.H.1.3.4, SC.H.1.3.7, SC.H.2.3.1

I found this information on page _________.

Analyse the world map of the seven major land biomes in your book. Infer two factors you think scientists might use to classify biomes of the world.

1. __________________________
2. __________________________

Use the word climate in a scientific sentence.

climate

___________________________

___________________________

Define Read the definitions below. Write the key terms on the blanks in the left column.

most biologically diverse biome

ideal biome for growing crops and raising cattle and sheep

cold, dry, treeless biome with a short growing season and permafrost

biome with thin soil where organisms are adapted to survive extreme conditions

biome containing cone-bearing evergreen trees and dense forests

biome usually having four distinct seasons

Use a dictionary to define dominate as it relates to the chapter.

dominate

___________________________

___________________________
Complete the comparison chart below using your book and the world map of the seven biomes.

<table>
<thead>
<tr>
<th>Major Biomes</th>
<th>Physical Description</th>
<th>Average Precipitation</th>
<th>Temperature</th>
<th>Location</th>
<th>Plant and Animal Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tundra</td>
<td>less than 25 cm per year</td>
<td></td>
<td></td>
<td></td>
<td>Plants:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Animals:</td>
</tr>
<tr>
<td>Taiga</td>
<td>temperature range: 25°C to 21°C</td>
<td></td>
<td></td>
<td></td>
<td>Plants:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Animals:</td>
</tr>
<tr>
<td>Temperate Deciduous Forest</td>
<td>eastern US, Europe, parts of Asia and Africa</td>
<td>Plants:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Animals:</td>
</tr>
<tr>
<td>Temperate Rain Forest</td>
<td>dense forest with a variety of plants and animals</td>
<td>Plants:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Animals:</td>
</tr>
</tbody>
</table>
### Section 2 Biomes (continued)

**Main Idea**

<table>
<thead>
<tr>
<th>Physical Description</th>
<th>Average Precipitation</th>
<th>Temperature</th>
<th>Location</th>
<th>Plant and Animal Life</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tropical Rain Forest</strong></td>
<td></td>
<td></td>
<td></td>
<td>4 zones of plant and animal life</td>
</tr>
<tr>
<td>Plants:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animals:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Desert</strong></td>
<td></td>
<td></td>
<td></td>
<td>Plants:</td>
</tr>
<tr>
<td>western US and S. America, Africa, parts of Australia and Asia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animals:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grasslands</strong></td>
<td>mild to hot</td>
<td></td>
<td></td>
<td>Plants:</td>
</tr>
<tr>
<td>prairies—N. America, steppes—Asia, savannas—Africa pampas—S. America</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animals:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Connect It**

Analyze the information you recorded about biomes. Compare and contrast the tundra with the desert.
Ecosystems
Section 3 Aquatic Ecosystems

Read the What You’ll Learn objectives of Section 3. Write three questions that come to mind from reading these statements.
1. ____________________________
2. ____________________________
3. ____________________________

Define the key terms to show their scientific meanings.
aquatic ____________________________
__________________________
__________________________
coral reef ____________________________
__________________________
__________________________
wetland ____________________________
__________________________
__________________________

Organize the four important factors that determine how well a species can survive in an aquatic environment.
1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________

Freshwater Ecosystems
I found this information on page ____________.
### Main Idea

**Freshwater Ecosystems**

I found this information on page ________.

### Details

**Compare** fast-moving streams with slower-moving streams as you complete the sentences below about freshwater environments.

<table>
<thead>
<tr>
<th>Fast-moving Streams</th>
<th>Slow-moving Streams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currents quickly ____________</td>
<td>Water moves slowly and debris ____________</td>
</tr>
<tr>
<td>____________</td>
<td>____________</td>
</tr>
<tr>
<td>As water tumbles, air ____________</td>
<td>These environments have higher ____________, more plant ____________, and organisms ____________</td>
</tr>
<tr>
<td>____________</td>
<td>____________</td>
</tr>
<tr>
<td>These streams have clearer ____________ and higher ____________</td>
<td>____________</td>
</tr>
</tbody>
</table>

**Classify** each statement as a characteristic of pond ecosystems, lake ecosystems, or both. Mark P for pond, L for lake, or B for both ecosystems.

- _____ more plants than flowing water environments
- _____ deeper water and colder water temperatures
- _____ larger body of water
- _____ plankton floating near the surface
- _____ ecosystem high in nutrients
- _____ small, shallow body of water
- _____ lower light levels at depth limit types of organisms
- _____ plant growth limited to shallow water near shore
- _____ water hardly moves

---

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Section 3 Aquatic Ecosystems (continued)

**Main Idea**

**Freshwater Ecosystems**
*I found this information on page _________.*

**Details**

Organize information about wetlands as you complete the concept map below.

[Wetlands concept map]

source of products such as
also known as
located between
animals may include

and

and

well-adapted to

**Saltwater Ecosystems**
*I found this information on page _________.*

**Complete the outline below about saltwater ecosystems.**

I. Coral reef ecosystems are ____________________________

A. reefs formed by ____________________________
B. damaged by ____________________________

II. Seashores
A. affected by ____________________________ and ____________________________
B. intertidal zone organisms must adapt to ____________________________,
   ____________________________, and ____________________________ changes

III. Estuaries
A. contain ____________________________
B. are important for ____________________________

98 Ecosystems
Tie It Together

Interactions within Ecosystems

Select one of the ecosystems discussed in this chapter. You might choose a tundra ecosystem, a rain forest ecosystem, a coral reef ecosystem, or one of the other ecosystems. Take notes about your ecosystem on the lines below. Then, draw a picture of your ecosystem with its animal and plant inhabitants. Show any interactions that you described.

My ecosystem is a(n) ________________________________.

It includes these plants:

__________________________________________________________

__________________________________________________________

It includes these animals:

__________________________________________________________

__________________________________________________________

It's environment includes these conditions:

__________________________________________________________

__________________________________________________________

__________________________________________________________

Interactions between organisms include these:

__________________________________________________________

__________________________________________________________

Interactions between organisms and the environment include these:

__________________________________________________________

__________________________________________________________

__________________________________________________________

Sketch of My Ecosystem
Ecosystems  Chapter Wrap-Up

Think about the terms and descriptions below. Write the term that most closely matches the description on the line in front of the description. Compare your previous answers to these.

<table>
<thead>
<tr>
<th>biome</th>
<th>ecosystem</th>
<th>estuary</th>
<th>intertidal zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>community of living organisms interacting with each other and their physical environment</td>
<td>part of the shoreline that is under water at high tide and exposed to the air at low tide</td>
<td>a large geographic area with an interactive environmental community and similar climate</td>
<td>extremely fertile area where a river meets an ocean; contains a mixture of freshwater and saltwater and serves as a nursery for many species</td>
</tr>
</tbody>
</table>

Review
Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

Summarize It
After reading this chapter, identify three things you have learned about ecosystems.
Earth’s Energy and Mineral Resources

Before You Read

Preview the chapter including section titles and the section headings. Complete the table by listing at least one idea for each of the three sections in each column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I know</td>
<td>What I want to find out</td>
</tr>
</tbody>
</table>

Write three ways electricity may be generated at a power plant.

Construct the Foldable as directed at the beginning of this chapter.
Scan Section 1 of your book, using the checklist below.

- Read all section titles.
- Read all boldface words.
- Look at all of the pictures.
- Think about what you already know about nonrenewable resources.

Write three facts that you discovered about nonrenewable resources as you scanned this section.

1. 
2. 
3. 

Define fuel.

New Vocabulary

Use your book or a dictionary to define the vocabulary terms.

resource

nonrenewable resource

conservation

Use a dictionary to define extract.
Main Idea

Energy

I found this information on page ____________.

Fossil Fuels

I found this information on page ____________.

Details

Complete the paragraph below to describe resources and energy.

A ____________ is any material used to satisfy a need. Most energy resources used to generate electricity are ____________.

Nonrenewable resources are ____________________________________________________________________________.

Organize information about fossil fuels by completing the outline.

I. Fossil Fuels
   A. Made of __________________________________________________________________________________
   B. Formed over ____________ of years
   C. Include:
      1. ______________________________________________________________________________________
      2. ______________________________________________________________________________________
      3. ______________________________________________________________________________________
   D. Used to:
      1. Make gasoline for ____________
      2. Heat ____________
      3. Generate ____________

Complete the chart describing the stages of coal formation. Then identify the change in the amount of energy contained in the fuel.

<table>
<thead>
<tr>
<th>Formation of Coal</th>
<th>1. peat</th>
<th>contains ____________ energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 1 Nonrenewable Energy Resources (continued)

Main Idea

Fossil Fuels
I found this information on page __________.

Details

Compare oil and natural gas by completing the Venn diagram with at least nine facts.

<table>
<thead>
<tr>
<th>Oil</th>
<th>Both</th>
<th>Natural Gas</th>
</tr>
</thead>
</table>

Create a graphic organizer to identify the ways fossil fuels are removed from the ground. Then complete the sentence below.

Fossil fuel ___________ are the useable and cost-effective part of existing fossil fuel ___________.

Sequence the steps in a nuclear chain reaction.

1. ___________ are fired at fuel rods containing ___________.
2. Neutrons hit ___________ atoms. The atoms split apart, releasing ___________ and ___________.
3. More ___________ atoms split, releasing more ___________ and more ___________.
Earth’s Energy and Mineral Resources

Section 2 Renewable Energy Resources

Benchmarks—SC.D.2.3.2: The student knows the positive and negative consequences of human action on the Earth’s systems. Also covers: SC.A.2.3.3, SC.B.1.3.1, SC.B.2.3.2, SC.D.2.3.1, SC.G.2.3.1, SC.G.2.3.4, SC.H.3.3.4

Predict three things that might be discussed in Section 2 as you read the headings.

1. 
2. 
3. 

Use your book or a dictionary to define energy.

energy

Use your book or a dictionary to define the vocabulary terms.

renewable resource

geothermal energy

biomass energy

Use a dictionary to define derive.

derive
Section 2 Renewable Energy Resources (continued)

Main Idea

Renewable Energy Resources

I found this information on page ____________.

Details

Contrast passive and active solar energy by providing examples.

An example of passive solar energy is ________________

__________________________________________________.

An example of active solar energy is ________________

__________________________________________________.

Compare the advantages and disadvantages of generating electricity from wind energy.

<table>
<thead>
<tr>
<th>Wind Energy as Source of Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Model a hydroelectric power plant. Use the figure in your book.

I found this information on page ____________.
Identify three problems associated with geothermal power.

1. 

2. 

3. 

Compare these examples of biomass that can be used to generate energy. List the advantages and disadvantages of each.

<table>
<thead>
<tr>
<th>Biomass Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
</tr>
<tr>
<td>Wood</td>
</tr>
<tr>
<td>Alcohol</td>
</tr>
<tr>
<td>Garbage</td>
</tr>
</tbody>
</table>
Earth’s Energy and Mineral Resources

Section 3 Mineral Resources

**Benchmarks—SC.D.2.3.2:** The student knows the positive and negative consequences of human action on the Earth’s systems.

Also covers: SC.D.2.3.1, SC.G.2.3.1, SC.G.2.3.4, SC.H.1.3.6, SC.H.3.3.4, SC.H.3.3.5, SC.H.3.3.6

**Skim** through Section 3 of your book. Read the headings and look at the illustrations. Write three questions that come to mind.

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

**Review Vocabulary**

Use your book or a dictionary to define metal.

**New Vocabulary**

Use your book or a dictionary to define the vocabulary terms.

**Academic Vocabulary**

Use a dictionary to define obtain.

---

**Name ___________________________ Date ____________**

108  Earth’s Energy and Mineral Resources
A mineral deposit is considered an ore when:

1.

2.

3.

Sequence the steps in separating a useful mineral from its ore by completing the graphic organizer below. Then define smelting.

Ore

\[\begin{array}{c}
\text{Concentrating: } \\
\hline \\
\text{Gangue} \\
\hline
\end{array}\]

\[\begin{array}{c}
\text{Refining: } \\
\hline \\
\hline
\text{Useful ore} \\
\hline
\end{array}\]

Smelting: ____________________________________________

I found this information on page ____________.

I found this information on page ____________.
Describe specific ways you could practice each of the three ways to conserve mineral resources in your home.

 CONNECT IT

Classify mineral resources and building materials by completing the Venn diagram with at least seven materials.

Create a graphic organizer to identify the ways to conserve mineral resources.
Tie It Together

Evaluate Energy Resources

Identify which alternative energy resource you think could best serve your community. Write a report explaining why you believe it would be the best choice. Discuss advantages and disadvantages for your community of using the alternative energy resource.
Earth’s Energy and Mineral Resources  Chapter Wrap-Up

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
<th>W</th>
<th>What I want to find out</th>
<th>L</th>
<th>What I learned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

Review

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☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things you have learned about Earth’s energy and mineral resources.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
The Atmosphere in Motion

Sunshine State Standards—SC.B.1: The student recognizes that energy may be changed in form with varying efficiency. Also covers: SC.D.1

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>The Atmosphere in Motion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The atmosphere protects living things from harmful doses of ultraviolet radiation and X-ray radiation.</td>
<td></td>
</tr>
<tr>
<td>• Earth is often referred to as the water planet.</td>
<td></td>
</tr>
<tr>
<td>• Fast-moving molecules transfer energy to slower-moving molecules when they bump into them.</td>
<td></td>
</tr>
<tr>
<td>• The highest layer of the atmosphere is the stratosphere.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Write a short newspaper article to warn people about the dangers of an approaching hurricane.

---

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The Atmosphere in Motion

Section 1 The Atmosphere

Scan Section 1 of your book. Use the checklist below.

- Read all section titles.
- Read all boldface words.
- Read all charts and graphs.
- Look at all of the pictures.
- Think about what you already know about the atmosphere.

Write three facts you discovered about nonrenewable resources as you scanned this section.

1. ____________________________
2. ____________________________
3. ____________________________

Review Vocabulary

Use your book or a dictionary to define evaporation.

evaporation
________________________________________________________
________________________________________________________

New Vocabulary

Use your book to define the following terms.

atmosphere
________________________________________________________
________________________________________________________
aerosols
________________________________________________________
________________________________________________________
water cycle
________________________________________________________
________________________________________________________

Academic Vocabulary

Use a dictionary to define affect.

affect
________________________________________________________
Complete the graphic organizer below to identify the ways that the atmosphere makes Earth fit for life.

Label the gases that form the three main components of the atmosphere, and indicate the percentage of each.

**Percentage of Gases in the Atmosphere**

- : ___ %  
- : ___ %  
Other: ~1%

Summarize information about aerosols by completing the outline.

I. Examples of aerosols
   A. Solids
      1. 
      2. 
      3. 
   B. Tiny liquid droplets
      1. 
Organize information about the layers of the atmosphere by completing the diagram. Name and describe a characteristic of each layer, and identify how far up the layer extends.

Earth’s Water

Complete the diagram by identifying the four stages of the water cycle.
The Atmosphere in Motion

Section 2 Earth’s Weather

Scan Section 2 of your book. Read the headings and look at the illustrations. Write three questions that come to mind.

1. ____________________________
2. ____________________________
3. ____________________________

Review Vocabulary
condensation

Use your book to define condensation.

New Vocabulary
humidity

dew point

relative humidity

Use your book to define the following terms. Then write a sentence using each term.

humidity

dew point

relative humidity

Academic Vocabulary
indicate

Use a dictionary to define indicate.

indicate

Name ____________________________ Date ____________________________
Create a graphic organizer to identify the six weather factors.

Sequence how energy moves through the atmosphere by completing the labels on the diagram.

1. Earth’s surface is warmed by ______________________.

2. Air at the surface is heated by ______________________.

3. Cool air pushes warm air upward, creating a ______________________.
Section 2 Earth’s Weather

Main Idea

Clouds

Identify the different types of precipitation.

1. 
2. 
3. 
4. 
5. 

Complete the diagram of Earth by identifying the major wind belts and drawing arrows to indicate the prevailing direction of the winds within each belt.

<table>
<thead>
<tr>
<th>Class</th>
<th>Altitude</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>2,000 m or below</td>
<td>cumulus,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a type that can extend from low to high:</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Identify the different types of precipitation.

Precipitation

Wind

Connect It

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The Atmosphere in Motion 119
The Atmosphere in Motion
Section 3 Air Masses and Fronts

Benchmarks—SC.1.3.5: The student understands concepts of time and size relating to the interaction of Earth's processes.
Also covers: SC.B.2.3.1, SC.D.1.3.3, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.7, SC.h.2.3.1, SC.H.3.3.4

Predict three things that will be discussed as you read the headings of Section 3 of your book.

1. ________________________________
2. ________________________________
3. ________________________________

Review Vocabulary

Use your book or a dictionary to define thunderstorm.

thunderstorm

______________________________________________________________________________

New Vocabulary

Write the terms to the left of their definitions.

______________________________________________________________________________
large body of air that develops over a particular region of Earth's surface

______________________________________________________________________________
boundary that develops where air masses of different temperatures collide

______________________________________________________________________________
violent, whirling wind, usually less than 200 m in diameter, that travels a narrow path over land and can be highly destructive

______________________________________________________________________________
large storm that begins as an area of low pressure over tropical oceans

Academic Vocabulary

Use a dictionary to define occur.

occur

______________________________________________________________________________
Section 3 Air Masses and Fronts (continued)

**Main Idea**

**Air Masses**

I found this information on page _________.

**Details**

Complete the blanks in the sentences about air masses.

Air masses that ____________ in one area for a few days pick up the ____________ of that area. For example, an air mass that stays over a tropical ocean will become ____________ and ____________.

Contrast the four types of fronts by completing the chart.

<table>
<thead>
<tr>
<th>Type of Front</th>
<th>How It Forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold front</td>
<td>Warm air advances into region of colder air, the warm, less dense air slides up and over the colder air.</td>
</tr>
<tr>
<td>Stationary front</td>
<td>Fast-moving cold front overtakes a slower warm front.</td>
</tr>
</tbody>
</table>

Compare ways that high pressure and low pressure affect weather.

<table>
<thead>
<tr>
<th>High pressure forms.</th>
<th>Air</th>
<th>Moisture in air cannot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Low pressure forms.</th>
<th>Air flows in and</th>
<th>Moisture in air</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Main Idea

Severe Weather

Compare and contrast at least eight main characteristics of thunderstorms and tornadoes in the Venn diagram below.

Thunderstorms

Both

Tornadoes

Hurricanes

Describe each of the following characteristics of a hurricane.

1. Wind gusts

2. Storm surge

3. Beach erosion

CONNECT IT

Explain the difference between a severe weather watch and a severe weather warning in terms of how you should respond to each.
Tie It Together

Model Sunlight on Earth

Design a way to demonstrate how the curved surface of Earth can affect how much sunlight the equator receives versus how much the North Pole receives. Test your model. Write a list of detailed observations.
After reading this chapter, identify three things that you have learned about Earth’s atmosphere.

<table>
<thead>
<tr>
<th>The Atmosphere in Motion</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The atmosphere protects living things from harmful doses of ultraviolet radiation and X-ray radiation.</td>
<td></td>
</tr>
<tr>
<td>• Earth is often referred to as the water planet.</td>
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</tr>
<tr>
<td>• Fast-moving molecules transfer energy to slower-moving molecules when they bump into them.</td>
<td></td>
</tr>
<tr>
<td>• The highest layer of the atmosphere is the stratosphere.</td>
<td></td>
</tr>
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</table>

Review

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- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Re-read the chapter and review the charts, graphs, and illustrations.
- [ ] Review the Self Check at the end of each section.
- [ ] Look over the Chapter Review at the end of the chapter.

Summarize It

After reading this chapter, identify three things that you have learned about Earth’s atmosphere.
Weathering and Soil

Sunshine State Standards—SC.D.1: The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Weathering and Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Plants can break apart rock.</td>
</tr>
<tr>
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<td>• Climate affects the rate at which soil forms.</td>
</tr>
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<td>• Soil on steep slopes tends to be thicker than soil at the bottom of a slope.</td>
</tr>
<tr>
<td></td>
<td>• Humans sometimes cause erosion to occur faster than new soil can form.</td>
</tr>
</tbody>
</table>

Foldables Study Organizer

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

A tor is a pile of boulders left on land after the surrounding, weakened rock is worn away. Write a poem about a tor. Use words in your poem that rhyme with the word tor.

A tor is a pile of boulders
Leaves and leaves with no flowers

Boulders and boulders
Rocks and rocks for the cows....
Scan the headings of Section 1 to determine two main types of weathering that will be discussed.

1. 
2. 

Define surface area, and use it in a scientific sentence.

surface area

Read the definitions below. Write the key term on the blank in the left column.

- surface processes that break rock into smaller and smaller pieces
- physical processes that break rock apart without changing its chemical makeup
- mechanical weathering process that occurs when water freezes in the cracks in rock and expands
- process in which chemical reactions dissolve the minerals in rock or change them into different minerals
- chemical weathering process that occurs as minerals are exposed to air and water
- the long-term pattern of weather that occurs in a particular area

Use a dictionary to define the term process.
Sequence the sediment grain types in order of size.

Coarsest ➔ Finest

Organize information by completing the outline below as you read.

Mechanical Weathering

I. Plants and Animals
   A. 
   B. 
   C. 

II. Ice Wedging
   A. 
   B. 
   C. 

III. Surface Area
   A. 
   B. 
   C. 

Weathering and Its Effects

I found this information on page ________.
Section 1 Weathering (continued)

**Main Idea**

**Chemical Weathering**

Sequence steps to explain how carbon dioxide causes chemical weathering.

**Details**

<table>
<thead>
<tr>
<th>Chemical Weathering by Carbonic Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
</tbody>
</table>

**Synthesize** the effects of climate and rock type on the rate of weathering in the table below.

<table>
<thead>
<tr>
<th>Factors that Affect the Rate of Weathering</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor</strong></td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Climate</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Rock type</td>
</tr>
</tbody>
</table>

**Analyze** how oxygen can cause chemical weathering. Discuss where you have seen oxidation around your home.

Name ____________________________________________ Date ____________

Section 1 Weathering (continued)
Weathering and Soil
Section 2 The Nature of Soil

Benchmarks—SC.D.1.3.4: The student knows the ways in which plants and animals reshape the landscape (e.g., bacteria, fungi, worms, rodents, and other organisms add organic matter to the soil, increasing soil fertility, encouraging plant growth, and strengthening resistance to erosion). Also covers: SC.D.1.3.5

Predict two things that might be discussed in this section on the basis of its title.

1. 

2. 

Define the term profile.

profile

New Vocabulary

Use your book or a dictionary to define the following terms.

soil

humus

horizon

soil profile

litter

leaching

Academic Vocabulary

Use a dictionary to define layer.

layer
Formation of Soil

Identify the 5 components of soil, and create a symbol to represent each.

<table>
<thead>
<tr>
<th>Component of Soil</th>
<th>My Soil Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compare and contrast dry soil and moist soil. Create sketches in the top row, and write descriptions in the bottom row.

<table>
<thead>
<tr>
<th>Dry Soil</th>
<th>Moist Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 2  The Nature of Soil (continued)

**Main Idea**

**Soil Profile**

*I found this information on page __________.*

**Details**

*Model a soil profile by drawing and labeling it below.*

---

*I found this information on page __________.*

**Organize** *information about soil structure in the concept map.*

![Types of Peds Concept Map]

---

**Soil Types**

*I found this information on page __________.*

**Summarize** *information about how soil varies in different regions.*

<table>
<thead>
<tr>
<th>Region</th>
<th>Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>desert</td>
<td></td>
</tr>
<tr>
<td>prairie</td>
<td></td>
</tr>
<tr>
<td>temperate</td>
<td>forest</td>
</tr>
</tbody>
</table>

**CONNECT IT**

Analyze relationships between organisms and soil. Describe how organisms use soil and how organisms affect soil.

---

_Weathering and Soil_ 131
Weathering and Soil

Section 3 Soil Erosion

Benchmarks—SC.D.1.3.1: The student knows that mechanical and chemical activities shape and reshape the Earth's land surface by eroding rock and soil in some areas and depositing them in other areas, sometimes in seasonal layers. Also covers: SC.D.1.3.4, SC.D.1.3.5, SC.H.1.3.3, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.6

**Skim** the headings and the boldfaced terms in Section 3. Identify three facts about soil erosion and ways to reduce its occurrence.

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

**Review Vocabulary**

*Use erosion in a scientific sentence.*

*erosion*  

**New Vocabulary**

*Define the following terms. Then use each term in an original scientific sentence.*

*no-till farming*  

__________________________

__________________________

__________________________

*contour farming*  

__________________________

__________________________

__________________________

*terracing*  

__________________________

__________________________

__________________________

**Academic Vocabulary**

*Define the term compensate.*

*compensate*  

__________________________

__________________________

__________________________

Name __________________________ Date _______________

Weathering and Soil  

132
Section 3 Soil Erosion (continued)

Main Idea

Soil—An Important Resource

Evaluate why soil erosion is a serious problem for agriculture.

Organize information on the causes and effects of soil erosion by completing the diagram below.

Identify the causes and effects of excess sediment.

Causes and Effects of Soil Erosion

I found this information on page ____________.

Weathering and Soil 133
Main Idea

Preventing Soil Erosion

I found this information on page ________.

Details

Summarize methods of preventing soil erosion.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage crops</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td>3.</td>
</tr>
<tr>
<td>Reduce erosion on slopes</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td>Reduce erosion on exposed soil</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td>3.</td>
</tr>
</tbody>
</table>

Connect It

Identify ways to prevent erosion that are probably used in your community and explain why they are used.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Tie It Together

Model

Recall evidence of erosion that you have seen in your community. Then create a model to demonstrate how the erosion probably occurred. You may make a working three-dimensional model that you can demonstrate for the class. You may represent your model with a labeled drawing. Describe how the model can be changed to prevent erosion.
Weathering and Soil  Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Weathering and Soil</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
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</tr>
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<td></td>
</tr>
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<td>Humans sometimes cause erosion to occur faster than new soil can form.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

Summarize It

After reading this chapter, identify three things you have learned about weathering and soil.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Water Erosion and Deposition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• The presence of plants can affect how much water runs off the land.</td>
</tr>
<tr>
<td></td>
<td>• When a river forms, its course never changes.</td>
</tr>
<tr>
<td></td>
<td>• Water that soaks into the ground becomes part of a system, just as water above ground does.</td>
</tr>
<tr>
<td></td>
<td>• Beaches are always made of pieces of rock.</td>
</tr>
</tbody>
</table>

Hoodoo are narrow towers of rock. What processes might have formed hoodoos? What will happen if this process continues?

Construct the Foldable as directed at the beginning of this chapter.
Skim Section 1 of your book and read the headings. Write three questions that come to mind. Try to answer your questions as you read.

1. ____________________________________________

2. ____________________________________________

3. ____________________________________________

Define erosion.

erosion ____________________________________________

Write a paragraph that uses each vocabulary term in a way that shows its scientific meaning.

drainage basin ____________________________________________

meander ____________________________________________

Use your book or a dictionary to define likewise.

likewise ____________________________________________

Water Erosion and Deposition

Section 1 Surface Water

Benchmarks—SC.D.1.3.1: The student knows that mechanical and chemical activities shape and reshape the Earth’s land surface by eroding rock and soil in some areas and depositing it in other areas, sometimes in seasonal layers.

Also covers: SC.D.1.3.3, SC.D.1.3.4, SC.D.1.3.5, SC.H.1.3.5, SC.H.1.3.6, SC.H.2.3.1
Section 1 Surface Water (continued)

Main Idea

Runoff
I found this information on page __________.

Water Erosion
I found this information on page __________.

River System Development
I found this information on page __________.

Details

Distinguish four factors that determine how much runoff occurs after rain falls.

Factors Affecting Runoff

- [ ]
- [ ]
- [ ]
- [ ]

Summarize the causes and effects of four types of surface water erosion in the chart below.

<table>
<thead>
<tr>
<th>Type</th>
<th>Causes</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gully</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stream</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Scan the map of drainage basins in the United States in your text.
Identify three major drainage basins.
1. __________________________
2. __________________________
3. __________________________
Sequence the stages of stream development. Complete the flow chart to identify the key features of each stage.

**Stages of Stream Development**

- **Young Streams**
- **Mature Streams**
- **Old Streams**

Contrast the roles and locations of dams and levees.

Deposition by Surface Water

Summarize how rivers deposit sediments. Describe how deltas and alluvial fans form.

As water slows, it _______________.

These deposits form a delta when _______________. They form an alluvial fan when _______________.

**Synthesize It**

A broad, flat river flows slowly along its bed while a young, swift stream rushes past. Explain which one would probably deposit more sediment.
Scan the headings in Section 2. Then predict three topics that will be covered in this section.

1. ________________________________
2. ________________________________
3. ________________________________

Define pore.

New Vocabulary

Use your book to define the following terms.

permeable

aquifer

water table

geyser

Use your book or a dictionary to define underlie.
**Main Idea**

**Groundwater Systems**

*I found this information on page ________.*

**Water Table**

*I found this information on page ________.*

**Details**

**Summarize** how groundwater collects. Complete the graphic organizer:

Soil is made of fragments of rocks and minerals with spaces between them.

**Create** a drawing that shows how groundwater flows. Label the impermeable layer, permeable layer, water table, and zone of saturation. *Use arrows to show how the groundwater flows.*

**Organize** information about wells and springs. Complete the table.

<table>
<thead>
<tr>
<th>Water Source</th>
<th>Important Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular well</td>
<td></td>
</tr>
<tr>
<td>Artesian well</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td></td>
</tr>
</tbody>
</table>
Section 2 Groundwater (continued)

Main Idea

**Water Table**

*Sequence the events that cause a geyser to erupt. Complete the flow chart.*

1. 

2. 

3. 

4. 

Details

**The Work of Groundwater**

*Complete the concept map to identify ways that groundwater shapes land.*

- Caves
- Stalactites
- Stalagmites
- Sinkholes

**Groundwater shapes land.**

CONNECT IT

Aquifers are important natural resources. Due to human activity, the levels of some aquifers have dropped over time. What problems can this cause for humans?
Scan Section 3 of your text using the checklist below.

- Read all section titles.
- Read all bold words.
- Look at all pictures and labels.
- Think about what you already know about waves and shorelines.

Write three facts you discovered about ocean shorelines as you scanned the section.

1. ________________________________________________________________
2. ________________________________________________________________
3. ________________________________________________________________

Define spring tide.

spring tide

Use your book to define the following terms.

longshore current

Use your book or a dictionary to find the meaning of transport as a verb. Then write a sentence using the term.

transport
Section 3 Ocean Shoreline (continued)

Main Idea

The Shore

I found this information on page ________.

Rocky Shorelines

I found this information on page ________.

Complete the graphic organizer below to identify how shoreline erosion occurs.

**Causes of Shoreline Erosion**

- Waves
- Longshore Currents
- Tides

Sequence three steps in the erosion process of a rocky shoreline.

Create a sketch to help you remember each step.

1. __________

2. __________

3. __________
Section 3 Ocean Shoreline (continued)

Main Idea

Sandy Beaches
I found this information on page _________.

Sand Erosion and Deposition
I found this information on page _________.

Details

Summarize how beach sand forms.

Analyze ways that beaches can change.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Analyze how barrier islands form and change. Complete the outline.

I. How barrier islands form
   A. _____________________________
   B. _____________________________

II. How barrier islands change
   A. _____________________________
   B. _____________________________

SYNTHESIZE IT

Which shoreline feature would you expect to last longest: a rocky shoreline, a sandy beach, or a barrier island? Which would you expect to last the shortest time? Explain your answer.
Tie It Together

Test Soil Permeability

*In a small group, collect several different types of soil or rock, such as gravel, sand, and clay. Test the permeability of each sample by following the process below.*

1. Cut the top from a plastic 2-liter bottle. Be sure to follow safety procedures when cutting.
2. Place about 10 cm of the material to be tested in the bottom part of the bottle.
3. Pour 100 ml of water into the bottle. Use a stopwatch to determine how long it takes the water to soak into the material. Observe the substance carefully until there is no water collected on the surface of the soil or gravel.
4. Record your results in the table below.
5. Remove the material from the bottle, and rinse and dry the bottle thoroughly. Then repeat steps 1–4 with the other materials you chose.

<table>
<thead>
<tr>
<th>Material</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Given your results, which material would you use in the yard of a house built on a low area? Explain your answer.*
Water Erosion and Deposition
Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Water Erosion and Deposition</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
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☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT
After reading this chapter, identify three things that you have learned about erosion and deposition by water.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Plate Tectonics

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Plate Tectonics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fossil evidence provides support for the idea that continents have moved over time.</td>
<td></td>
</tr>
<tr>
<td>• New seafloor is continuously forming while old seafloor is being destroyed.</td>
<td></td>
</tr>
<tr>
<td>• Earth’s crust is broken into sections called plates.</td>
<td></td>
</tr>
<tr>
<td>• Rock flows deep inside Earth.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Pretend you’re a journalist with an audience that assumes the continents have never moved. Write about the kinds of evidence you’ll need to convince people otherwise.

---

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Plate Tectonics
Section 1 Continental Drift

Benchmarks—SC.D.1.3.3: The student knows how conditions that exist in one system influence the conditions that exist in other systems; SC.1.3.1: The student knows that scientific knowledge is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way.

Also covers: SC.D.1.3.2, SC.D.1.3.5, SC.H.1.3.2, SC.H.1.3.6, SC.H.2.3.1, SC.H.3.3.5

Skim through Section 1 of your book. Write three questions that come to mind from reading the headings and examining the illustrations.

1. 
2. 
3. 

Define continent to show its scientific meaning.

continental drift

Pangaea

Use a dictionary to define controversy.

Use your book to define the following terms. Then write an original sentence using each term.

Review Vocabulary

New Vocabulary

Academic Vocabulary
Summarize Alfred Wegener’s hypothesis about Earth’s continents.

Create a graphic organizer to identify the 3 types of clues that are evidence for continental drift.

Analyze the clue in the left column below. Then describe how Alfred Wegener would have explained it in the right column.

<table>
<thead>
<tr>
<th>Clue</th>
<th>Wegener’s Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fossils of Mesosaurus found in South America and Africa</td>
<td></td>
</tr>
<tr>
<td>Fossil plant found in five continents, including Antarctica</td>
<td></td>
</tr>
<tr>
<td>Fossils of warm weather plants found on Arctic island</td>
<td></td>
</tr>
<tr>
<td>Glacial deposits found in Africa, India, and Australia</td>
<td></td>
</tr>
</tbody>
</table>
Section 1 Continental Drift (continued)

Main Idea

Model what the continents may have looked like 250 million years ago.

Details

Summarize Wegener’s explanations of how and why continental drift occurs.

Wegener’s explanation for continental drift

How: _____________________________________________

________________________________________________________________________

Why: _____________________________________________

________________________________________________________________________

EVALUATE IT

Do you think it was reasonable for scientists initially to reject the hypothesis of continental drift? Explain your response.
Predict three things that might be discussed in Section 2 after reading its headings.
1. 
2. 
3. 

Define seafloor. Then use the word in a sentence.

Use your book to define seafloor spreading. Then use the term in a sentence.

Use a dictionary to define interval. Then use the word in a sentence about magnetic clues to seafloor spreading.
Section 2  Seafloor Spreading (continued)

**Main Idea**

**Mapping the Ocean Floor**

* I found this information on page __________.

---

**Details**

**Summarize** how sound waves are used to map the seafloor.

---

**Model** the process of seafloor spreading by drawing a cross section of a mid-ocean ridge and the magma below it. Use arrows to indicate the directions of motion.

---

**Sequence** steps describing seafloor spreading.

1. Hot, less dense material below Earth’s crust rises toward the surface at a mid-ocean ridge.

   ![Diagram of seafloor spreading](image)

2. The less dense material flows ________________________________

   ________________________________.

3. As the seafloor spreads apart, magma is ________________________

   ________________________.
Section 2 Seafloor Spreading (continued)

Main Idea

Evidence for Spreading

Label the diagram below to identify evidence for seafloor spreading. Add arrows to show the direction of spreading, and indicate where older rock and newer rock occur.

Model the polarity of Earth’s magnetic field today.

- Draw a sphere to represent Earth.
- Label the north pole and south pole.
- Draw arrows indicating the direction in which magnetic lines of force enter and leave Earth.

Summarize how reversals in the direction of Earth’s magnetic field have provided evidence for seafloor spreading.

At times, the ____________________________ that pass through Earth have ____________________________. ______________ of Earth’s magnetic field are recorded in ______________ that forms along ____________________________. Scientists can detect ____________________________ that are ______________ to mid-ocean ridges. This occurs on ____________________________.
Scan the headings and illustrations in Section 3. List four features caused by plate tectonics.

1. ____________________  3. ____________________
2. ____________________  4. ____________________

Define the review terms to show their scientific meanings.

converge

diverge

transform

Use your book to define the following terms.

plate

plate tectonics

lithosphere

asthenosphere

convection current

Use a dictionary to define rigid.

rigid
Complete the following outline on the theory of plate tectonics.

I. A new theory
   A. In the 1960s, a new theory called ____________ was developed.
   B. Earth’s ____________ and part of the ____________ are broken into sections called ____________, that move slowly.

II. Details about the theory
   A. The layer of Earth that is broken into sections is called the ____________.
   B. The ____________ is the plasticlike layer below the ____________.
   C. The rigid plates move over the ____________.

Compare and contrast the different plate boundaries by defining them side by side. Draw the plates of the world. Identify plate motion by using arrows.

<table>
<thead>
<tr>
<th>Divergent</th>
<th>Convergent</th>
<th>Transform</th>
</tr>
</thead>
</table>

Plate Boundaries

I found this information on page ____________.
Causes of Plate Tectonics

I found this information on page _________.

Features Caused by Plate Tectonics

I found this information on page _________.

Main Idea

Details

Label the convection currents depicted below with heating, rising, cooling, and sinking.

Organize information to describe features caused by plate tectonics. Fill in the table below.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rift valley</td>
<td></td>
</tr>
<tr>
<td>Folded and faulted mountains</td>
<td></td>
</tr>
<tr>
<td>Strike-slip faults</td>
<td></td>
</tr>
</tbody>
</table>

Testing for Plate Tectonics

I found this information on page _________.

Summarize how the Satellite Laser Ranging System measures plate movement.

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
Tie It Together

Synthesize It

Your book has a picture showing how continents may have drifted. It shows their positions 250 million years ago, 125 million years ago, and at the present. Work with a partner to trace the paths that the continents have taken. Then extend their paths forward in time to project where they may be 125 million years from now. Draw a map in the space below, showing your prediction.
Plate Tectonics Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Plate Tectonics</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fossil evidence provides support for the idea that continents have moved over time.</td>
<td></td>
</tr>
<tr>
<td>• New seafloor is continuously forming while old seafloor is being destroyed.</td>
<td></td>
</tr>
<tr>
<td>• Earth’s crust is broken into sections called plates.</td>
<td></td>
</tr>
<tr>
<td>• Rock flows deep inside Earth.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things you have learned about plate tectonics.
Before You Read

Before you read the chapter, respond to these statements.

1. Write A if you agree with the statement.
2. Write D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Measurements are recorded by using numbers.</td>
<td></td>
</tr>
<tr>
<td>• Most scientists use inches and feet to record length.</td>
<td></td>
</tr>
<tr>
<td>• Measurements can be precise but not accurate.</td>
<td></td>
</tr>
<tr>
<td>• A bar graph shows parts of a whole.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of the chapter.

Science Journal

As a pit crew member, how can you determine how far a car travels per liter of fuel? Explain in your Science Journal how you would do this.
Benchmarks—SC.A.1.3.1: The student identifies various ways in which substances differ. Also covers: SC.A.1.3.2, SC.A.1.3.3, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.7

**Measurement**

Section 1 Description and Measurement

Skim Section 1 of your book. Write three questions that come to mind from reading the headings of this section.

1. 
2. 
3. 

**Review Vocabulary**

Define description to show its scientific meaning.

**New Vocabulary**

Define each vocabulary term.

**Academic Vocabulary**

Use a dictionary to define accurate. Use accurate in an original sentence to show its scientific meaning.

Name ____________________________ Date __________
Compare and contrast qualitative and quantitative descriptions. Fill in the Venn diagram to explain how these two types of description are the same and different. Include both a simple definition and an example of each type of description.

**Qualitative**
- provide information on properties or characteristics of objects

**Both**

**Quantitative**

**Define** measurement. *Then give five examples of things that are measured.*

Measurement is _________________________________.

**Examples:**
1. ________________________________
2. ________________________________
3. ________________________________
4. ________________________________
5. ________________________________

**Distinguish** two situations in which you might use estimation.

1. ________________________________
2. ________________________________
Section 1 Description and Measurement (continued)

Main Idea

Units of Measurement
I found this information on page ____________.

Details

Identify the quantity each base unit and symbol is used to measure. Fill in the first column of the table with the proper quantity.

<table>
<thead>
<tr>
<th>Amount of Substance</th>
<th>Electric Current</th>
<th>Intensity of Light</th>
</tr>
</thead>
<tbody>
<tr>
<td>length</td>
<td>mass</td>
<td>temperature</td>
</tr>
<tr>
<td>time</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SI Base Units</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>Unit</td>
<td>Symbol</td>
</tr>
<tr>
<td>meter</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td>kilogram</td>
<td>kg</td>
<td>kg</td>
</tr>
<tr>
<td>kelvin</td>
<td>K</td>
<td>K</td>
</tr>
<tr>
<td>second</td>
<td>s</td>
<td>s</td>
</tr>
<tr>
<td>ampere</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>mole</td>
<td>mol</td>
<td>mol</td>
</tr>
<tr>
<td>candela</td>
<td>cd</td>
<td>cd</td>
</tr>
</tbody>
</table>

Organize information about length in the graphic organizer.

Tool: __________________________

A measure of: __________________________

Length

SI units: __________________________

Volume

I found this information on page ____________.

Distinguish methods of finding volume.

Regular square or rectangular objects: __________________________

Irregular objects: __________________________
Explain why it is important to have a standard system of units for scientists to use for measuring.

Contrast mass and weight. Complete the table.

<table>
<thead>
<tr>
<th></th>
<th>Mass</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>What does it measure?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What SI units are used to measure it?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is it the same everywhere?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Label the diagrams to identify important temperatures in the three temperature scales. Circle the scale that is used for SI units.

- Kelvin (K)
- Celsius (C)
- Fahrenheit (F)

Boiling point of water
Freezing point of water
Absolute zero

Analyze the relationship between time and rate.

Time is measured in ______________ in the SI system. It tells __________________________. A rate is ______________.

SYNTHEZIZE IT
Benchmarks—SC.H.1.3.4: The student knows that accurate record keeping, openness, and replication are essential to maintaining an investigator's credibility.

Read the What You’ll Learn objectives of Section 2. Write questions that come to mind from reading these statements.

1. _______________________________________________________________________
2. _______________________________________________________________________

Define unit to show its scientific meaning.

unit

Define each vocabulary term.

accuracy

precision

significant digits

Use a dictionary to define significant. Use significant in an original sentence to show its scientific meaning.

significant

Use significant in an original sentence to show its scientific meaning.
Section 2 Mathematics and Measurement (continued)

Main Idea

Calculations
I found this information on page  ____.

Significant Digits
I found this information on page  ____.

Details

Summarize why the number of recorded digits matters.

Complete the table of rules for using significant digits. Identify each category as always, sometimes, or never significant.

<table>
<thead>
<tr>
<th>Type of Digit</th>
<th>Significant?</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-zero digits</td>
<td></td>
</tr>
<tr>
<td>zeros between other digits</td>
<td></td>
</tr>
<tr>
<td>zeros at the beginning of a number</td>
<td></td>
</tr>
<tr>
<td>zeros in whole numbers</td>
<td></td>
</tr>
</tbody>
</table>

Summarize how to use significant digits in multiplication and division and in addition and subtraction.

When multiplying and dividing, the number of significant digits in the answer is determined by ________________ in the problem. In addition and subtraction, the number of significant digits in the answer is determined by ________________.

Sequence the steps to follow when rounding a measurement.

Look at the digit ________________________________

- If the digit is less than 5, __________________________
- If the digit is 5 or greater, __________________________
### Main Idea

**Calculations with Units**

I found this information on page _________.

**Summarize** how to handle units when adding, subtracting, multiplying, or dividing measurements.

<table>
<thead>
<tr>
<th></th>
<th>Adding</th>
<th>Subtracting</th>
<th>Multiplying</th>
<th>Dividing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Details

**Precision and Accuracy**

I found this information on page _________.

**Contrast** precision and accuracy. Define each term. Then complete the Venn diagram with examples of measurements that are precise, accurate, and both precise and accurate.

Precision is _________________________________.

Accuracy is _________________________________.

- **Precise**
- **Both**
- **Accurate**

- measurements of 13.54 cm and 13.56 cm for an actual length of 13.55 cm
Scan Section 3. Write two facts you discovered as you scanned the section.
1. 
2. 

Review Vocabulary

axis

Use axis in an original sentence to show its scientific meaning.

New Vocabulary

circle graph

dependent variable

Define each vocabulary term.

bar graph

line graph

independent variable

Academic Vocabulary

Use a dictionary to define category. Use category in an original sentence to show its scientific meaning.

category
Complete the outline to describe tables and graphs.

I. Tables
   A. 
   B. 

II. Graphs
   A. 
   B. 

Create a sample line graph. Label the x-axis and y-axis.

Summarize what kind of data can be shown on a line graph.
Section 3 Tables and Graphs (continued)

Main Idea

Bar Graphs
I found this information on page ___________.

Circle Graphs
I found this information on page ___________.

Details

Model a bar graph of your own. Write a caption explaining each part of the graph.

Sequence the steps to follow to create a circle graph.
1. __________________________
2. __________________________
3. __________________________

Evaluate why it is important to examine the scale on a graph. Explain why a broken scale is sometimes useful.

SYNTHESIZE IT

Compare the two graphs of U.S. endangered species per year in your book. Which do you think is more accurate? Which shows the data most clearly? Why? What other type of graph might you use to show these data?
Measurement Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Measurements are recorded by using numbers.</td>
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☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

Summarize It
After reading this chapter, identify three things you have learned about measurement.

---

172 Measurement
Sunshine State Standards—SC.A.1: The student understands that all matter has observable, measurable properties.

### Before You Read

*Before you read the chapter, respond to these statements.*

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Understanding Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Plasma is one of the four states of matter.</td>
</tr>
<tr>
<td></td>
<td>• A campfire results in chemical changes.</td>
</tr>
<tr>
<td></td>
<td>• Melting is a physical change.</td>
</tr>
<tr>
<td></td>
<td>• Flammability is a physical property.</td>
</tr>
</tbody>
</table>

*Construct the Foldable as directed at the beginning of this chapter.*

*Science Journal*

Picture a SCUBA diver swimming underwater. How many states of matter would there be? List as many as possible.
Understanding Matter
Section 1 Physical Properties and Changes

Benchmarks—SC.A.1.3.1: The student identifies various ways in which substances differ. Also covers:
SC.A.1.3.4, SC.A.1.3.5, SC.A.1.3.6, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.7, SC.H.2.3.1

**Skim** Section 1 in your book. Write three questions that come to mind from reading the headings and examining the illustrations.

1. ______________________________________________________
2. ______________________________________________________
3. ______________________________________________________

**Define** mass to show its scientific meaning.

mass

**New Vocabulary** Use your book to define the following terms.

- **physical property**
- **density**
- **states of matter**
- **melting point**
- **boiling point**
- **physical change**

**Academic Vocabulary** Use a dictionary to define unique.

unique
Main Idea

Using Your Senses

I found this information on page _________.

Details

Complete the diagram to identify proper use of your senses in the laboratory.

Using Your Senses in the Laboratory

You may:

Do NOT:

Summarize this section’s discussion of physical properties by completing the outline below.

I. Physical properties
   A. Properties that can be seen
      1. _______________
      2. shape
      3. _______________
      4. Degree to which light can pass through
         a. _______________: you can see clearly through it
         b. translucent: _______________
         c. _______________
   B. Properties of metals
      1. _______________: ability to be shaped
      2. _______________: ability to be drawn into wires
   C. Measurable properties
      1. length: measured with _______________
      2. _______________: the amount of matter
      3. _______________: the amount of space an object takes up
      4. _______________: the amount of mass in a given volume
Describe the movement of particles in each state of matter. Then complete the statement about plasma.

### States of Matter

<table>
<thead>
<tr>
<th>State of Matter</th>
<th>Motion of Particles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td>Particles vibrate in a fixed place.</td>
</tr>
<tr>
<td>Liquid</td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td></td>
</tr>
</tbody>
</table>

Plasma is common in ____________, but less common on _______________.

### Physical Changes

Summarize physical changes by completing the blanks.

<table>
<thead>
<tr>
<th>State of Matter</th>
<th>Physical Change</th>
<th>State of Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>solid</td>
<td>melting</td>
<td>_______________</td>
</tr>
<tr>
<td>_______________</td>
<td>boiling</td>
<td>_______________</td>
</tr>
<tr>
<td>liquid</td>
<td>_______________</td>
<td>solid</td>
</tr>
<tr>
<td>_______________</td>
<td>condensation</td>
<td>_______________</td>
</tr>
<tr>
<td>solid</td>
<td>_______________</td>
<td>gas</td>
</tr>
</tbody>
</table>

Complete this sentence.

Physical properties can be used to (1) _______________, (2) _______________, and (3) _______________ substances.

**CONNECT IT**

Analyze the importance of being able to sort laundry before washing. Which two physical properties of the laundry could be affected by washing? Explain.
Scan the headings of Section 2. Identify three basic topics that will be covered.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Define the following terms. Then use each term in an original sentence.

heat

chemical property

chemical change

Law of Conservation of Mass

undergo
### Main Idea

**Ability to Change**

Contrast a chemical change with a physical change by completing the chart.

**Details**

<table>
<thead>
<tr>
<th>Type of change</th>
<th>Result of change</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical change</td>
<td>Properties of a substance change but the identity of the substance remains the same.</td>
<td></td>
</tr>
<tr>
<td>Chemical change</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Common Chemical Properties

Organize information about chemical properties and give an example of each.

- Flammability e.g. firewood
- Example

---

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Main Idea

**Something New**

Create a graphic organizer to identify six signs of chemical change.

**Details**

Create a graphic organizer to identify six signs of chemical change.

**The Law of Conservation of Mass**

Model the law of conservation of matter, using the words below to complete the example of a wood fire.

- gases
- wood
- ashes
- oxygen
- smoke

When you add water to dry plaster of Paris, does a physical or a chemical change occur? Explain your answer.

CONNECT IT
Understanding Matter  Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

<table>
<thead>
<tr>
<th>Understanding Matter</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
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<td></td>
</tr>
<tr>
<td>• A campfire results in chemical changes.</td>
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</table>

Review

*Use this checklist to help you study.*

- [ ] Review the information you included in your Foldable.
- [ ] Study your Science Notebook on this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Re-read the chapter and review the charts, graphs, and illustrations.
- [ ] Review the Self Check at the end of each section.
- [ ] Look over the Chapter Review at the end of the chapter.

**SUMMARIZE IT**

After reading this chapter, identify three things that you have learned about physical and chemical properties.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

180 Understanding Matter
Atoms, Elements, and the Periodic Table

Before You Read

Preview the chapter title, section titles, and the section headings. List at least two ideas for each section in each column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What I know</strong></td>
<td><strong>What I want to find out</strong></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Make a list of three questions that you think of when you see hot air balloons.
Atoms, Elements, and the Periodic Table

Section 1 Structure of Matter

Benchmarks—SC.A.2.3.2: The student knows the general properties of the atom (a massive nucleus of neutral neutrons and positive protons surrounded by a cloud of negative electrons) and accepts that single atoms are not visible. Also covers: SC.D.1.3.5, SC.H.1.3.1, SC.H.1.3.5, SC.H.1.3.6, SC.H.3.3.4, SC.H.3.3.5

Read the What You’ll Learn statements for Section 1. Write three questions that come to mind. Look for answers to each question as you read the section.

1. 
2. 
3. 

Define density to show its scientific meaning.

small particle that makes up most kinds of matter
uncharged particle in the nucleus of an atom
invisible, negatively charged particle
anything that has mass and takes up space
statement that matter is not created or destroyed, but only changes its form
positively charged central part of an atom
positively charged particle in the nucleus of an atom

Use a dictionary to define theory.
Main Idea

What is matter?
What isn’t matter?

I found this information on page ________.

Details

State the 2 characteristics common to all matter.
1. ____________________________
2. ____________________________

Label each example as matter or not matter.
air ______________ light ______________
heat ______________ water ______________

Organize Democritus’s ideas about atoms. Complete the concept map.

Identify the 2 main ideas in Dalton’s atomic theory of matter.
1. ____________________________
2. ____________________________

Summarize Lavoisier’s experiment and the conclusion he drew from it.

<table>
<thead>
<tr>
<th>Experiment:</th>
<th>Conclusion:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Compare and contrast the Thomson and Rutherford atomic models.

Create a drawing of the Bohr atom. Label the positively charged, negatively charged, and neutral parts.

Identify how the modern model of the atom differs from the Bohr model.

Make a relative time line of atomic models. List the models from oldest to youngest. State the new discovery that was made with the development of each new model.
Atoms, Elements, and the Periodic Table

Section 2  The Simplest Matter

Benchmarks—SC.A.2.3.2; SC.H.2.3.1: The student recognizes that patterns exist within and across systems.
Also covers: SC.A.1.3.1, SC.H.1.3.1, SC.H.3.3.5

Review Vocabulary

Academic Vocabulary

Name _____________________________ Date ____________

Atoms, Elements, and the Periodic Table

Skim the headings and subheadings in Section 2. Write three predictions about what you will learn in this section.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Use mass in a scientific sentence.

mass

Write the correct vocabulary term next to each definition.

_______ matter made of only one kind of atom
_______ number of protons in the nucleus of each atom of an element
_______ atom of an element with a different number of neutrons
_______ the number of protons plus the number of neutrons in an atom
_______ weighted average mass of the isotopes of an element
_______ element that generally has a shiny luster and is a good conductor of heat and electricity
_______ element that is usually dull in appearance and is a poor conductor of heat and electricity
_______ element that has characteristics of metals and nonmetals

Use a dictionary to define fundamental.

fundamental

Atoms, Elements, and the Periodic Table  185
Section 2 The Simplest Matter (continued)

Main Idea

The Elements
I found this information on page _________.

The Periodic Table
I found this information on page _________.

Identifying Characteristics
I found this information on page _________.

Details

Summarize three key facts about elements.
1. ________________________________________________________________________
2. ________________________________________________________________________
3. ________________________________________________________________________

Complete the graphic organizer to show how the periodic table is organized.

The Periodic Table

is organized in

rows, called ________
that have

columns, called ________
that have

Label the square below with information you would find about chlorine on the periodic table. Identify each piece of information and explain what you can learn from it.

Cl
Section 2 The Simplest Matter (continued)

Main Idea

Identifying Characteristics
I found this information on page .

Classification of Elements
I found this information on page .

Details

Contrast the three isotopes of hydrogen. Complete the table.

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Protium</th>
<th>Deuterium</th>
<th>Tritium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of protons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of neutrons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass number</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize the 4 characteristics of each type of element in the table below.

<table>
<thead>
<tr>
<th>Metals</th>
<th>Nonmetals</th>
<th>Metalloids</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Synthesize It

Metals, nonmetals, and metalloids are located in specific areas of the periodic table. Use what you know about elements and the periodic table to explain why this is.

_________________________

_________________________

_________________________
Scan Section 3 using the checklist below.

- Read all section headings.
- Read all bold words.
- Read all charts and graphs.
- Look at the pictures.
- Think about what you already know about compounds and mixtures.

Write two facts you learned about compounds and mixtures as you scanned the section.

1. ____________________________
2. ____________________________

Define formula. Then use the term in an original sentence to show its scientific meaning.

- formula

Use each vocabulary term in a scientific sentence.

- substance
- compound
- mixture

Use a dictionary to define symbol. Give an example of a symbol you have used in science.

- symbol
Substances

I found this information on page __________.

Classify the types of substances. Complete the graphic organizer by describing each type and giving two examples.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize what information is contained in the formula of a compound.

Analyze the formula of each compound. Identify which elements are in each compound and how many atoms of each element make up one unit of the compound.

<table>
<thead>
<tr>
<th></th>
<th>Water</th>
<th>Hydrogen peroxide</th>
<th>Carbon dioxide</th>
<th>Carbon monoxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula</td>
<td>H₂O</td>
<td>H₂O₂</td>
<td>CO₂</td>
<td>CO</td>
</tr>
<tr>
<td>Atoms and elements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Contrast compounds and mixtures. Complete the Venn diagram with at least 5 facts.

**Mixtures**

I found this information on page __________.

**Details**

A homogeneous mixture _________________.
You __________ see the individual parts. A heterogeneous mixture _________________.
You __________ see the individual parts.

Examples of a homogeneous mixture: ____________________
____________________________________________________

Examples of a heterogeneous mixture: ____________________
____________________________________________________

**Summarize** characteristics of homogeneous and heterogeneous mixtures.

Give examples of two mixtures and two compounds that are important to your everyday life.

____________________________________________________
____________________________________________________
____________________________________________________
____________________________________________________

**CONNECT IT**
Tie It Together

The formulas for three substances are listed below.

• Describe the properties of each substance as thoroughly as you can.
• Identify each as an element or a compound.
• Write the number of protons in the nuclei of the element or elements in each substance.
• State whether those elements are metals, nonmetals, or metalloids, and any properties you can infer for those elements.
• Use a periodic table.

1. Water (H₂O):

2. Table salt (NaCl):

3. Gold (Au):

Name ___________________________ Date ____________
Atoms, Elements, and the Periodic Table  Chapter Wrap-Up

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column. How do your ideas now compare with those you provided at the beginning of the chapter?

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
<th>W</th>
<th>What I want to find out</th>
<th>L</th>
<th>What I learned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.

☐ Study your Science Notebook on this chapter.

☐ Study the definitions of vocabulary words.

☐ Review daily homework assignments.

☐ Re-read the chapter and review the charts, graphs, and illustrations.

☐ Review the Self Check at the end of each section.

☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about atoms and elements.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Before You Read

Before you read the chapter, respond to these statements.
1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Motion, Forces, and Simple Machines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Motion is always described relative to an object that is assumed not to be moving.</td>
</tr>
<tr>
<td></td>
<td>• Velocity changes when either speed or direction of motion changes.</td>
</tr>
<tr>
<td></td>
<td>• The direction of a force is opposite to the direction of the push or pull.</td>
</tr>
<tr>
<td></td>
<td>• A compound machine is a combination of simple machines.</td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Write a paragraph comparing the motion of a ball and a paper airplane being thrown high in the air and returning to the ground.

---

Motion, Forces, and Simple Machines

Sunshine State Standards—SC.G.2: The student understands that the types of force that act on an object and the effect of that force can be described . . . . Also covers: SC.A.1, SC.C.1

Before You Read

Before you read the chapter, respond to these statements.
1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
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<tr>
<td></td>
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</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Write a paragraph comparing the motion of a ball and a paper airplane being thrown high in the air and returning to the ground.
Scan the headings and bold words in Section 1. Write three facts you discovered about motion as you scanned this section.

1. ________________________________
2. ________________________________
3. ________________________________

Define galaxy to show its scientific meaning.

Define speed to show its scientific meaning.

Define velocity to show its scientific meaning.

Define acceleration to show its scientific meaning.

Academic Vocabulary

Use your book or a dictionary to define initial.
Main Idea

Motion Is Relative

I found this information on page __________.

Motion Is a Change in Position

I found this information on page __________.

Speed

I found this information on page __________.

Details

Model relative motion by sketching an object in motion relative to an object at rest. Label the object at rest as the reference point.

Summarize motion and distance by completing the paragraph.

Motion occurs when the __________ of an object __________. The __________ an object travels is the __________ between its __________ position and its __________ position.

Define the term average speed by completing the equation.

\[
\text{average speed (m/s)} = \text{______________}
\]
Identify and label the velocity of a car moving at 50 km/h at the two different points in the diagram. State what is happening as the car turns the corner.

As the car turns the corner, ____________________________.

Complete the graphic organizer to identify the factors that cause acceleration.

Acceleration occurs when an object ____________________________.

List four factors used to describe motion.

1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________
Motion, Forces, and Simple Machines

Section 2 Forces and Motion

Predict three things that might be discussed in Section 2 as you read the headings.

1. 
2. 
3. 

Define gravitation to show its scientific meaning.

Use your book to define the following terms.

force

balanced forces

inertia

friction

gravity

Use your book or a dictionary to define mechanism.
Summarize the characteristics that describe forces by completing the list below.

1. A force is ________________________________.
2. All forces have a ____________ and a ____________.
3. The size of a force is called the ____________ of the force.
4. In SI units, the strength of a force is measured in ____________.

Model the two ways to combine forces by sketching and labeling two diagrams. Use arrows to indicate forces, and indicate the direction of net force.

A.  

B.  

Distinguish balanced forces and unbalanced forces on an object by completing the paragraph below. Then draw a model to represent balanced forces on an object, using arrows to indicate forces.

When forces are ____________, there is zero net force on an object and the object does not ______________. Unbalanced forces can cause an object to either move, or ______________.

Example of balanced forces:
Main Idea

**Inertia**

*I found this information on page _________.*

**Contact Forces**

**Non-contact Forces**

*I found this information on page _________.*

**Gravity**

*I found this information on page _________.*

Details

**Label** the arrow below to show the relationship between mass and inertia.

- Mass increases.  
  Inertia _________.
- Mass decreases.  
  Inertia _________.

**Organize** information about the different contact and noncontact forces by completing the chart below.

![Diagram of forces classified as contact and non-contact with examples included]

**Complete** the graphic organizer to identify factors that affect gravity.

Forces that affect gravity include

---

**Summarize It**

Describe the relationship between mass and weight.
Skim Section 3 of your book. Read the headings and look at the illustrations. Write three questions that come to mind.

1. _____________________________
2. _____________________________
3. _____________________________

Define force to show its scientific meaning.

force

_______________________________

Write the vocabulary term that matches each definition.

device that does work with only one movement

_______________________________

number of times the input is multiplied by a machine

_______________________________

grooved wheel with a rope or cable wrapped around the groove

_______________________________

rod or plank that pivots or rotates about a fixed point called the fulcrum

_______________________________

simple machine that is a flat, sloped surface

_______________________________

Use your book or a dictionary to define compound as an adjective.

compound

_______________________________
Define machine. *Then complete the table to compare the two main types of machines.*

A machine is _____________________________.

<table>
<thead>
<tr>
<th>Machines</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Definition</td>
<td>Example</td>
</tr>
<tr>
<td>Simple machine</td>
<td>device that uses only one movement to do work</td>
<td></td>
</tr>
<tr>
<td>Compound machine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Complete the diagram to provide an example of input work and output work. Then complete the paragraph below.*

Output __________ is always less than input __________ because of __________. Work is made easier, however, because a machine can make output __________ greater than input __________.

*Model a combination pulley made of two wheels by sketching it below. Then provide a caption to describe how output force is made greater than input force.*
Section 3 Simple Machines (continued)

Main Idea

The Lever
I found this information on page __________.

The Inclined Plane
I found this information on page __________.

Identify one simple machine and one compound machine in your classroom.

SYNTHESIZE IT

Details

Label the arrows on each of the diagrams below as either input force ($F_i$) or output force ($F_o$). Then identify the class of lever that each diagram represents.

Identify which inclined plane would need more force to move an object up it. Complete the blanks below with less or greater.

Complete the graphic organizer to identify three examples of the inclined plane.

Inclined Plane

_______ force needed to move an object

_______ force needed to move an object
Tie It Together

Design an Experiment

Design an experiment to examine the effect of different variables on the speed and/or distance that a marble or ball bearing travels. Your variables might include such things as the height and/or length of a ramp that is used to generate force, a smooth or rough surface, or the mass of the marbles and/or ball bearings used in the experiment.
Motion, Forces, and Simple Machines

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Motion, Forces, and Simple Machines</th>
<th>After You Read</th>
</tr>
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Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

Summarize It

After reading this chapter, identify three things that you have learned about motion, forces, and simple machines.
Energy

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• A moving object has energy.</td>
</tr>
<tr>
<td></td>
<td>• Energy can change forms.</td>
</tr>
<tr>
<td></td>
<td>• Temperature is a form of energy.</td>
</tr>
<tr>
<td></td>
<td>• Conduction occurs when particles collide.</td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List three changes that you have seen occur today, and describe what changed.

________________________ |
|________________________ |
|________________________ |
Benchmarks—SC.A.2.3.3: The student knows that radiation, light, and heat are forms of energy used to cook food, treat diseases, and provide energy. Also covers: SC.B.1.3.1, SC.B.1.3.2, SC.B.1.3.4, SC.B.2.3.1

Energy
Section 1 Energy Changes

Scan the headings in Section 1 of your book. Then, write four questions about energy. Try to answer your questions as you read.

1. ____________________________________________________________
2. ____________________________________________________________
3. ____________________________________________________________
4. ____________________________________________________________

Define energy transfer using your book or a dictionary.

energy transfer

Use your book or a dictionary to define the vocabulary words.

energy

kinetic energy

potential energy

law of conservation of energy

Use a dictionary to define transform.

transform
Identify three changes caused by energy. Use your book to help you.

1. ________________________________
2. ________________________________
3. ________________________________

Compare the effects of mass and speed on kinetic energy by filling in the blanks below with the terms more or less.

A moving object with more mass has _________ kinetic energy.

A moving object with less mass has _________ kinetic energy.

A moving object moving with _________ speed has more kinetic energy.

A moving object moving with _________ speed has less kinetic energy.

Create a diagram in the space below that shows the effect of position and gravity on potential and kinetic energy. If you need help, refer to the picture of a ski slope in your book. Be sure to show the following points in your diagram:

• where potential energy is increasing and decreasing
• where kinetic energy is increasing and decreasing
• where potential energy is the greatest
• where kinetic energy is the least
**Main Idea**

**Forms of Energy and Measuring Energy**

I found this information on page __________.

**Changing Forms of Energy**

I found this information on page __________.

**Using Energy, Conservation of Energy, and Useful Energy Always Decreases**

I found this information on page __________.

---

**Details**

Organize forms of energy by completing the concept map. Then identify two units for measuring energy.

Two units used to measure energy are the ________ and the ________.

Compare changing forms of energy by completing the diagram.

**Change in Form of Energy**

- Electric fan: electrical energy → mechanical energy
- Fireworks: chemical energy → ________ and ________ energy
- Electric stove: ________ energy → ________ energy

Summarize the principles of the law of conservation of energy by completing the following paragraph.

Useful energy is energy _____________________. Useful energy always decreases because, when energy changes form, _________________________.

The total amount of energy in the universe never _________.

This means that energy cannot be ________, or _________.

Energy can, however, change from one ________ to another.
Scan Section 2 of your book using the checklist below.

☐ Read all section titles.
☐ Read all boldface words.
☐ Look at all of the pictures.
☐ Think about what you already know about temperature.

Write three facts that you discovered about temperature and heat as you scanned the section.

1. 
2. 
3. 

Define the following terms by writing the term next to its definition.

particle formed when two or more atoms bond together

measure of the average kinetic energy of the particles in an object

transfer of energy from one object to another as a result of a difference in temperature
transfer of energy by collisions between atoms in a material

transfer of heat that occurs when particles move between objects or areas that differ in temperature

the transfer of energy by waves

Use a dictionary to write the scientific definition for transfer.

transfer

Academic Vocabulary
Analyze the effect that temperature has on the speed of motion and kinetic energy of the molecules of a gas by completing the table below.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Speed of Motion</th>
<th>Kinetic Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compare the Fahrenheit and Celsius temperature scales by drawing a thermometer below. Indicate water’s boiling point and freezing point on each scale.

Read the passage below. In the box, sketch a diagram. Label where thermal energy is transferred and where kinetic energy increased.

A girl playing baseball scrapes her knee sliding into home plate. The trainer places an ice pack on the knee. After a while, the ice pack begins to melt.
Complete the paragraph below about temperature change.

During summer, the water in a lake generally is __________________________. During winter, lake water generally is __________________________.

This temperature difference occurs because __________________________ or __________________________.

Complete the chart describing the 3 methods of heat transfer.

<table>
<thead>
<tr>
<th>Type of Heat Transfer</th>
<th>How It Occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td>conduction</td>
<td></td>
</tr>
<tr>
<td>convection</td>
<td></td>
</tr>
<tr>
<td>radiation</td>
<td></td>
</tr>
</tbody>
</table>

Imagine yourself stirring a hot cup of hot chocolate with a metal spoon. As you stir, you observe that the spoon becomes hot. Use what you’ve learned about heat to explain why this happens. In your explanation, describe the method or methods of heat transfer involved.
Energy  Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Energy</th>
<th>After You Read</th>
</tr>
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<tbody>
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Review
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☐ Study the definitions of vocabulary words.
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☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT  After reading this chapter, identify three things that you have learned about energy.

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

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Sunshine State Standards—SC.B.1: The student recognizes that energy may be changed in form with varying efficiency. Also covers: SC.C.2

Before You Read

Preview the chapter title, the section titles, and the section headings. List at least one thing you know and one thing you want to find out for each section of the chapter.

<table>
<thead>
<tr>
<th>K What I know</th>
<th>W What I want to find out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List five electrical devices you used today and describe what each device did.

_________________________________________

_________________________________________

_________________________________________

_________________________________________

_________________________________________
Objectives  Review the section objectives. Write three questions that these statements bring to mind.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Define atom to show its scientific meaning.

atom

Use your book or a dictionary to define the key terms.

charging by contact

charging by induction

static charge

electric discharge

Use a dictionary to define contact.

contact
Section 1 Electric Charge and Forces (continued)

Main Idea

Electric Charges
I found this information on page ___________.

The Forces Between Charges
I found this information on page ___________.

Details

Organize the parts of the atom in the table below.

<table>
<thead>
<tr>
<th>Particles That Make Up Atoms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Particle</strong></td>
</tr>
<tr>
<td>Proton</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Complete the statements to determine when atoms have electric charge.

Atoms have positive charge when
______________________________

______________________________

______________________________

when there are equal numbers of electrons and protons.

Atoms have negative charge when
______________________________

Model the forces between like and unlike charges between charged particles. Draw particles to show the forces for each situation.

<table>
<thead>
<tr>
<th>Positive Particle/ Negative Particle</th>
<th>Positive Particle/ Positive Particle</th>
<th>Negative Particle/ Negative Particle</th>
</tr>
</thead>
</table>

Summarize how electric force depends on distance and on charge.
Section 1  Electric Charge and Forces (continued)

Main Idea

Making Objects Electrically Charged

I found this information on page _________.

Details

Identify and define the two ways objects become electrically charged by completing the graphic organizer.

Organize information about insulators and conductors in the table below.

<table>
<thead>
<tr>
<th>Insulator</th>
<th>Conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition:</td>
<td>Definition:</td>
</tr>
<tr>
<td>Examples:</td>
<td>Examples:</td>
</tr>
</tbody>
</table>

CONNECT IT

Make a simple cartoon to show at least four people in a lightning storm. Show some of them acting safely, and some acting unsafely. Use information from the section to explain why each behavior is safe or unsafe.
Scan  Use the checklist below to preview Section 2 of your book.

☐ Read all section titles.
☐ Read all bold words.
☐ Look at all of the pictures, charts, and graphs.
☐ Think about what you already know about electric current.

Write three facts that you discovered about electric current as you scanned the section.

1. ____________________________________________________________
2. ____________________________________________________________
3. ____________________________________________________________

Use kinetic energy in a scientific sentence.

kinetic energy

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Read the definitions below. Write the key term on the blank in the left column.

measure of how difficult it is for electrons to flow in an object

setup of devices that allows current to follow one closed path

the flow of electric charges

a measure of the amount of electrical energy transferred by an electric charge as it moves from one point to another in a circuit

da setup of devices that allows current to follow more than one closed path

da closed path in which electric charges can flow

Define the word neutral to show its scientific meaning.

neutral

____________________________________________________________________

Electricity and Magnetism  217
Complete the sentences about electric current.

Electric current is _____________________________.

Electric current is measured using an SI unit called _____________________________.

Create a drawing of a circuit that performs a useful function.

Summarize two important facts about how a circuit works.

Organize information about how each factor affects electric charges in a circuit.

<table>
<thead>
<tr>
<th>Term</th>
<th>How It Affects Electric Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric field</td>
<td></td>
</tr>
<tr>
<td>Electric resistance</td>
<td></td>
</tr>
<tr>
<td>Battery</td>
<td></td>
</tr>
</tbody>
</table>
Define Ohm’s law by explaining the meaning of each letter in the equation: \( V = IR \).

\[ V \quad = \quad I \quad \times \quad R \]

Design a parallel circuit that has three paths, a battery, and three lightbulbs. Use your book to help you.

- Label each device.
- Use arrows to show the direction in which electricity flows in each path.

CONNECT IT

One bulb in a strand of decorative lights burns out and the rest of the strand stops working. Identify the type of circuit that was used to connect the lights.
Electricity and Magnetism

Section 3 Magnetism

Predict three concepts that might be discussed in Section 3.
1. 
2. 
3. 

Review Vocabulary

Use mechanical energy in a sentence that shows its meaning.
mechanical energy

New Vocabulary

Use the following key terms in original sentences that show their meaning.
magnetic domain
electromagnet
electromagnetic induction

Academic Vocabulary

Use a dictionary to define temporary. Then use it in a sentence that reflects its scientific meaning.
temporary
Main Idea

Magentes

Model how magnets exert forces on each other in the boxes below. Use the figure in your book to help you.

- Label the poles of the magnets.
- Use arrows to show how the magnets exert forces on each other.

<table>
<thead>
<tr>
<th>Two South Poles</th>
<th>North Pole and South Pole</th>
<th>Two North Poles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize attraction and repulsion of magnets.

Compare and contrast the way that paper clips interact with a magnet and the way paper clips interact with one another by filling in the blanks below.

__________________________ of a paper clip do not normally all point in the same direction. Therefore, paper clips ________________ to one another. The ________________ of a magnet mostly point in the ________________ direction.

When a magnet is brought near a paper clip, the magnetic domains of the paper clip ________________ so that

___________________________. This causes the paper clip to be ________________ to the magnet.
Analyze the way electromagnets work by completing the chart.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing the current of an electromagnet</td>
<td>The north and south poles of the magnet will change positions.</td>
</tr>
</tbody>
</table>

Sequence steps to generate electricity by electromagnetic induction.

<table>
<thead>
<tr>
<th>Electricity is generated using the following process:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

Synthesize It
Suppose that you are given two iron nails, wire, and two batteries of your choice. Draw and label designs for 2 electromagnets of different strengths made of these materials.
Identify five everyday devices that work by using electricity. Describe the energy transformations that take place within each device.

Device ________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Device ________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Device ________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Device ________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Device ________________________________

________________________________________________________________________

________________________________________________________________________
Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column. How do your ideas about What You Know now compare with those you provided at the beginning of the chapter?

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I know</td>
<td>What I want to find out</td>
<td>What I learned</td>
</tr>
</tbody>
</table>

Review

*Use this checklist to help you study.*

- Review the information you included in your Foldable.
- Study your *Science Notebook* on this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Re-read the chapter and review the charts, graphs, and illustrations.
- Review the Self Check at the end of each section.
- Look over the Chapter Review at the end of the chapter.

**Summarize It**

After reading this chapter, identify three things that you have learned about electricity and magnetism.
Waves

Before You Read

Before you read the chapter, read each statement below.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Waves</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Waves carry matter and energy.</td>
</tr>
<tr>
<td></td>
<td>• There is more than one kind of wave.</td>
</tr>
<tr>
<td></td>
<td>• Waves carry different amounts of energy.</td>
</tr>
<tr>
<td></td>
<td>• All waves travel at the same speed.</td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Write a paragraph about some places where you have seen water waves.
Waves
Section 1  What are waves?

Benchmarks—SC.C.1.3.2: The student knows that vibrations in materials set up wave disturbances that spread away from the source (e.g., sound and earthquake waves). Also covers: SC.A.2.3.1, SC.B.1.3.3, SC.B.1.3., SC.H.1.3.5, SC.H.2.3.1

Skim the title and headings of Section 1. List two things that might be discussed in this section.
1. __________________________________________
2. __________________________________________

Define energy in your own words.
energy

Define each vocabulary term using your book or a dictionary.
wave

mechanical wave

compressional wave

electromagnetic wave

transverse wave

Define medium in its scientific sense using a dictionary.

Section 1 What are waves? (continued)

**Main Idea**

**What is a wave?**

*Identify two types of waves that carry energy.*

1. 

2. 

*Contrast the energy carried in a sound wave and the energy in a moving ball.*

**A Model for Waves**

*Model how a wave can move energy without moving matter.*

- Label the parts of your drawing that represent matter and energy.
- Write a caption to explain your drawing.

---

**My Model for Waves**
Organize information about mechanical waves in the outline below.

Mechanical waves—Travel through a ________________.

A. Types of wave mediums
   1. ________________________________
   2. ________________________________
   3. ________________________________

B. Types of mechanical waves
   1. ________________________________
   2. ________________________________

Compare and contrast the characteristics of sound waves and electromagnetic waves by completing the Venn diagram below.

- carry energy
- carry radiant energy
- do not need a medium

Electromagnetic

Sound Waves and
Electromagnetic
Waves

I found this information on page _________.

CONNECT IT

Evaluate how electromagnetic and mechanical waves are useful in your daily life.

__________________________________________

__________________________________________

__________________________________________

__________________________________________
Scan Use the checklist below to preview Section 2 of your book.

☐ Read all section titles.
☐ Read all bold words.
☐ Look at all the pictures, charts, and graphs.
☐ Think about what you already know about waves.

Write three facts you discovered about wave properties as you scanned the section.

1. 
2. 
3. 

Define the key terms using a dictionary or your book.

speed 

amplitude 

wavelength 

frequency

Use the word parallel in a scientific sentence.

parallel

Benchmarks—SC.B.1.3.6: The student knows the properties of waves (e.g., frequency, wavelength, and amplitude); that each wave consists of a number of crests and troughs; and the effects of different media on waves. Also covers:
SC.H.1.3.5, SC.H.2.3.1
Section 2 Wave Properties (continued)

**Main Idea**

**Amplitude**
I found this information on page __________.

**Wavelength**
I found this information on page __________.

**Frequency**
I found this information on page __________.

**Details**

Create a transverse wave in the space below. Label the crest, trough, and amplitude of the wave on your drawing.

![Blank space for drawing]

Complete the descriptions for determining wavelength of two types of waves in the table below.

<table>
<thead>
<tr>
<th>Wavelength is the distance:</th>
<th>Type of Wave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transverse</td>
<td>Compressional</td>
</tr>
<tr>
<td>from one</td>
<td></td>
</tr>
<tr>
<td>to the next</td>
<td></td>
</tr>
<tr>
<td>or from one</td>
<td></td>
</tr>
<tr>
<td>to the next</td>
<td></td>
</tr>
</tbody>
</table>

Model the relationship between frequency and wavelength when wave speed is the same. In the top box, draw a wave with a frequency of one wavelength per second. In the bottom box, draw a wave with a frequency of two wavelengths per second.

<table>
<thead>
<tr>
<th>0 sec</th>
<th>1 sec</th>
<th>2 sec</th>
<th>3 sec</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summarize how to use the wave speed equation to calculate wave speed by completing the steps below.

1. The wave speed equation is
   \[ \text{wave speed in m/s} \]

2. To calculate the speed of a wave that has a frequency of 550 Hz and a wavelength of 0.8 m, insert the values into the wave speed equation.
   \[ \text{wave speed} \]

3. Multiply to find the answer.
   Answer: ________________

Compare the speeds of different types of waves in different mediums by completing the chart below with the words gases, liquids, or solids.

<table>
<thead>
<tr>
<th>Wave type</th>
<th>move fastest through</th>
<th>move slowest through</th>
</tr>
</thead>
<tbody>
<tr>
<td>mechanical waves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>electromagnetic waves</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Individual members of a choir sing at different pitches. Compare the wavelengths of the sound waves produced by soprano, alto, and baritone singers.
Waves
Section 3 Wave Behavior

Predict by reading the title and subheadings three things that might be discussed in this section.

1. 
2. 
3. 

Review Vocabulary

Use the word echo in a sentence to reflect its scientific use.

echo 

New Vocabulary

Use the new vocabulary terms to write your own original scientific sentences.

reflection 

refraction 

diffraction 

interference 

Define overlap to show its scientific meaning.

overlap 

Name ____________________________ Date _____________
Section 3  Wave Behavior (continued)

Main Idea

Reflection
I found this information on page __________.

Details

Skim the section about reflection. In the Question spaces, write two questions you have about reflection. As you read the section, write answers to your questions.

Question: ___________________________________________
Answer: ___________________________________________

Question: ___________________________________________
Answer: ___________________________________________

Refraction
I found this information on page __________.

Create a diagram below showing what happens to a light wave as it passes from water to air. Draw a second picture showing what happens as light passes from air to water. Label the normal and the light ray’s direction of travel in each drawing.

Summarize why light refracts when it passes from one material to another.

Sequence the seven colors into which sunlight separates when it passes through a prism.

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Section 3 Wave Behavior (continued)

Main Idea

Diffraction
I found this information on page __________.

What happens when waves meet?
I found this information on page __________.

Details

Summarize two factors that affect how much a wave can be diffracted as it passes a barrier or opening.

1. ____________________________
2. ____________________________

Model constructive and destructive interference in the two boxes below. Label the crests and troughs of the waves in your model.

<table>
<thead>
<tr>
<th>Interference</th>
<th>Constructive</th>
<th>Destructive</th>
</tr>
</thead>
</table>

Contrast the behavior of waves and particles by completing the table below.

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Waves</th>
<th>Particles</th>
</tr>
</thead>
<tbody>
<tr>
<td>When they pass through an opening</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When they meet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CONNECT IT
Use what you have learned about the behavior of waves to evaluate two ways to protect your ears from damage due to loud noises.

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

Waves
Tie It Together

Model Wave Motion

Design a model you could use to study the behavior and properties of waves. Draw your model below.

Answer each question about your model.

1. What medium does your model use?

2. How could you measure the wavelength of the waves in your model?

3. How could you use your model to demonstrate reflection, refraction, and diffraction of waves?
Waves  Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Waves</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Waves carry matter and energy.</td>
<td></td>
</tr>
<tr>
<td>• There is more than one kind of wave.</td>
<td></td>
</tr>
<tr>
<td>• Waves carry different amounts of energy.</td>
<td></td>
</tr>
<tr>
<td>• All waves travel at the same speed.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

Summarize It

After reading this chapter, identify three things you have learned about waves.

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

236  Waves
Exploring Space

Sunshine State Standards—SC.E.1: understands the interaction and organization in the Solar System and the universe . . . ; Also covers: SC.A.2, SC.H.1, SC.H.3

Before You Read

Preview the chapter including section titles and the section headings. Complete the table by listing at least one idea for each of the three sections in each column.

<table>
<thead>
<tr>
<th></th>
<th>K What I know</th>
<th>W What I want to find out</th>
</tr>
</thead>
</table>

**FOLDABLES Study Organizer**

Construct the Foldable as directed at the beginning of this chapter.

**Science Journal**

Do you think space exploration is worth the risk and expense? Explain.

___

___

___

___

___

___

___

___

___

___

___

___

___

___
Exploring Space
Section 1 Radiation from Space

Benchmarks—S.C.A.2.3.3: The student knows that radiation, light, and heat are forms of energy used to cook food, treat diseases, and provide energy. Also covers: S.C.H.1.3.1, S.C.H.1.3.4, S.C.H.1.3.5, S.C.H.1.3.7, S.C.H.3.3.5, S.C.H.3.3.6

**Review Vocabulary**

Define universe using your book or a dictionary

universe

**New Vocabulary**

Use your book or a dictionary to define the key terms.

electromagnetic spectrum

refracting telescope

reflecting telescope

observatory

radio telescope

**Academic Vocabulary**

Use a dictionary to define visible.

visible

---

Skim the objectives found in What You’ll Learn for Section 1. Write three questions that come to mind from reading these statements.

1. 

2. 

3. 

Write three questions that come to mind from reading these statements.

Define universe using your book or a dictionary

universe

Use your book or a dictionary to define the key terms.

electromagnetic spectrum

refracting telescope

reflecting telescope

observatory

radio telescope

Use a dictionary to define visible.
Main Idea

Electromagnetic Waves
I found this information on page ____________.

Details

List the seven forms of electromagnetic radiation.

1. _______________ 5. _______________
2. _______________ 6. _______________
3. _______________ 7. _______________
4. _______________

Compare and contrast short wavelength radiation with long wavelength radiation by completing the table below.

<table>
<thead>
<tr>
<th>Sketch of each wave</th>
<th>Short Wavelength</th>
<th>Long Wavelength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of frequency</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Optical Telescopes
I found this information on page ____________.

Compare a refracting telescope with a reflecting telescope.
• Draw cross-sections of each telescope.
• Use arrows to indicate the path taken by light in each type.
• Label the eyepiece lens, focal point, and any other mirrors or lenses.
• Model the shapes of a convex lens and a concave mirror.
Summarize information about the Hubble Space Telescope by completing the paragraph.

Scientists expected clear pictures from the telescope because it was ______________________________. First, astronauts had to ______________________________.

Astronomers used images from *Hubble* to discover a _________ at the center of the galaxy. *Hubble* will be replaced by the ______________________________. This telescope will be able to ______________________________.

Organize information about radio telescopes in the table below.

<table>
<thead>
<tr>
<th>Purpose:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design:</td>
</tr>
<tr>
<td>Collect information used to:</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

Radio waves from space have been studied for decades, but scientists have yet to find signs of intelligent life. Suggest several explanations for this.
Exploring Space
Section 2 Early Space Missions

Benchmarks—SC.E.1.3.2: The student knows that available data from various satellite probes show the similarities and differences among planets and their moons in the Solar System. Also covers: SC.D.2.3.5, SC.D.1.3.5, SC.E.1.3.1, SC.H.1.3.3, SC.H.1.3.6, SC.H.3.3.5, SC.H.3.3.6

Predict three things that you think might be discussed in this section after reading its headings.

1. __________________________________________

2. __________________________________________

3. __________________________________________

Write the correct vocabulary term next to each definition.

the force of attraction between two masses

curved path followed by a satellite as it revolves around an object

space mission with goal of landing a human on the Moon’s surface

special engine that can work in space and burns liquid or solid fuel

space mission with goals of connecting spacecraft in orbit and investigating the effects of space travel on the human body

any object that revolves around another object in space

space mission with goal of orbiting a piloted spacecraft around Earth and bringing it back safely

instrument that gathers information and sends it back to Earth

Define goal to show its scientific meaning.
Compare and contrast the two types of rockets by completing the Venn diagram with the information below.

**Solid-propellant rockets**
- can be shut down and restarted
- do not require air for operation
- liquid fuel and oxidizer stored in separate tanks
- preferred for long-term space missions

**Liquid-propellant rockets**
- gases thrust it forward
- rubberlike fuel contains oxidizer
- generally simpler
- cannot be shut down once ignited

Model the path of a satellite by drawing a satellite in orbit around a planet. Show the path of the satellite, and the path it would take if it were not affected by gravity.
Main Idea

Space Probes

Evaluate the advantages and disadvantages of space probes compared to spacecraft piloted by humans.

<table>
<thead>
<tr>
<th>Space Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages</td>
</tr>
<tr>
<td>Disadvantages</td>
</tr>
</tbody>
</table>

Moon Quest

Create a time line of the United States’ quest to reach the Moon by identifying an event that corresponds to each date.

1. ____________ 3. ____________ 5. ____________

2. ____________ 4. ____________

CONNECT IT

Design a plan for a space mission to take humans to Mars. Analyze challenges the crew would have to face. Develop a simple training program to help prepare the crew to face these challenges.
Exploring Space
Section 3 Current and Future Space Missions

Skim Section 3 of your text. Read the headings and examine the illustrations. Write three questions that come to mind. Try to answer your questions as you read.

1. __________________________________________
   __________________________________________
   __________________________________________

2. __________________________________________
   __________________________________________
   __________________________________________

3. __________________________________________
   __________________________________________
   __________________________________________

Review Vocabulary

Use cosmonaut in a sentence that shows its scientific meaning.

- cosmonaut __________________________________________
  __________________________________________
  __________________________________________

New Vocabulary

Use the following key terms in original sentences to show their scientific meaning.

- space shuttle __________________________________________
  __________________________________________
  __________________________________________

- space station __________________________________________
  __________________________________________
  __________________________________________

Define technology to show it’s scientific meaning.

- technology __________________________________________
  __________________________________________
  __________________________________________
Main Idea

The Space Shuttle
I found this information on page ________.

Details

Summarize key facts about the space shuttle below.

Engines: ______________________________________

____________________________________________________________________________________

Uses: ______________________________________

____________________________________________________________________________________

Landing: ______________________________________

____________________________________________________________________________________

Organize information about space stations. Complete the concept map with key facts about each space station.

Skylab

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

Mir

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

Space Stations

International Space Station

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

Complete the table about missions to Mercury and the Moon.

<table>
<thead>
<tr>
<th>Probe</th>
<th>Destination</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Messeinger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunar Prospector</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Research and construction of the earliest space stations was undertaken by nations working independently. Work on the International Space Station is being performed by many nations working together. Analyze some benefits to such international cooperation in scientific research.
Tie It Together

Design a Rover

Much of today’s planetary research is carried out using remote-controlled rovers that are monitored and maneuvered by scientists on Earth. Suppose that you could design a remote-controlled rover to conduct research on a planet or the Moon.

• Draw a sketch of your rover below.
• Identify features you would include on your rover.
• Explain why you would include each feature.
• Use what you have learned about space technologies in this section.
Exploring Space  Chapter Wrap-Up

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
<th>W</th>
<th>What I want to find out</th>
<th>L</th>
<th>What I learned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.

☐ Study your Science Notebook on this chapter.

☐ Study the definitions of vocabulary words.

☐ Review daily homework assignments.

☐ Re-read the chapter and review the charts, graphs, and illustrations.

☐ Review the Self Check at the end of each section.

☐ Look over the Chapter Review at the end of the chapter.

Summarize It

After reading this chapter, identify three things you have learned about exploring space.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>The Moon, Planets, and Stars</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A year on Earth is the time it takes to make one revolution around the Sun.</td>
<td></td>
</tr>
<tr>
<td>• A spring tide occurs when the position of the Sun, Earth, and the Moon form a 90˚ angle to one another.</td>
<td></td>
</tr>
<tr>
<td>• As a comet approaches the Sun, solar radiation changes some of the ice into gas.</td>
<td></td>
</tr>
<tr>
<td>• The Sun may end its life as a black hole.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Write a short story about what it would be like to ride on a comet as it orbits the Sun.
Skim Section 1 of your book. Read the headings and look at the illustrations. Write three questions that come to mind.

1. 
2. 
3. 

Review Vocabulary Define axis.

axis ____________________________________________________________________________________________

New Vocabulary Use your book to define the following terms.

orbit __________________________________________________________________________________________

lunar highlands __________________________________________________________________________________

maria __________________________________________________________________________________________

spring tide ______________________________________________________________________________________

neap tide ________________________________________________________________________________________

Academic Vocabulary Use a dictionary to define apparent.

apparent __________________________________________________________________________________________
Summarize how Earth moves by completing the chart below.

<table>
<thead>
<tr>
<th>Earth’s Movement</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Movement</td>
<td>Description</td>
<td>Duration of One Cycle</td>
</tr>
<tr>
<td>Rotation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revolution</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contrast Earth’s tilt relative to the Sun during the Northern Hemisphere’s summer and winter by labeling the diagram and completing the captions below.

During ________, the Northern Hemisphere is tilted ________ from the Sun. Sunlight strikes the hemisphere at a ________ angle for ________ hours than during the ________.

During ________, the Northern Hemisphere is tilted ________ from the Sun. Sunlight strikes the hemisphere at a ________ angle for ________ hours than during the ________.

Sequence the lunar cycle by completing the diagram.

---

The Moon, Planets, and Stars  239
Section 1 Earth’s Place in Space (continued)

Main Idea

Earth’s Moon

I found this information on page __________.

Details

Model the alignments that cause solar and lunar eclipses by drawing and labeling diagrams showing the positions of the Sun, the Moon, and Earth relative to one another.

<table>
<thead>
<tr>
<th>Solar Eclipse</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lunar Eclipse</td>
<td></td>
</tr>
</tbody>
</table>

Connect It

I found this information on page __________.

Compare spring tides with neap tides by completing the table below.

<table>
<thead>
<tr>
<th>Type of Tide</th>
<th>How It Occurs</th>
<th>Effect on Gravity</th>
<th>Effect on Tidal Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neap</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Draw a diagram of the Moon’s present phase. The diagram should depict the orientation of the Sun, Earth, and the Moon to one another. You can look at a calendar or newspaper to find out the present phase.
The Moon, Planets, and Stars

Section 2 The Solar System

Benchmarks—SC.E.1.3.1: The student understands the vast size of our Solar System and the relationship of the planets and their satellites. Also covers SC.D.1.3.5; SC.E.1.3.2

Scan the headings of Section 2 in your book. Identify three things that will be discussed as you tour the solar system.

1. 
2. 
3. 

Define system.

system

Fill in the blanks with the correct vocabulary.

system of nine planets and numerous other objects that orbit the Sun

distance equal to 150 million km

large body of ice and rock that orbits the Sun

rock from space that survives its plunge through the atmosphere and lands on Earth’s surface

Use your book or a dictionary to define concentrate.

concentrate
Section 2 The Solar System (continued)

Main Idea

Distance in Space

Model an astronomical unit by marking the distance on the diagram.

The Sun  Mercury  Venus  Earth  Mars

Touring the Solar System and Inner Planets

Organize key facts about Mercury by completing the table.

<table>
<thead>
<tr>
<th>Location</th>
<th>Surface</th>
<th>Atmosphere</th>
<th>Temperature</th>
</tr>
</thead>
</table>

Compare and contrast the physical properties of Venus and Earth by completing the Venn diagram with at least five facts.

Complete the graphic organizer to identify key features of Mars.

Mars

Soil  Ice caps  Moons

I found this information on page ____________.

I found this information on page ____________.

I found this information on page ____________.
Section 2 The Solar System (continued)

Main Idea

Outer Planets

I found this information on page ____________.

Comets

I found this information on page ____________.

Details

Summarize the characteristics shared by the gas giants and contrast them with Pluto.

The gas giants may have solid ________ but none has a solid ________. They are surrounded by ________ and ________.

Pluto is composed of ________ and ________.

Organize information about the outer planets in the chart.

Model a comet by sketching one as it would appear as it gets close to the sun. Indicate the parts and what they consist of.

Connect It

Identify factors that may prevent life from existing on other planets within our solar system.
The Moon, Planets, and Stars
Section 3 Stars and Galaxies

Predict three things that will be discussed as you scan the headings and illustrations of Section 3.

1. 
2. 
3. 

Define star.

Use your book to define the following terms.

constellation

supernova

galaxy

light-year

Use a dictionary to define collapse as a verb.

collapse
**Main Idea**

**Stars**

*Model a constellation by circling the Big Dipper within the constellation Ursa Major.*

*Compare stars’ colors and temperatures by completing the table.*

<table>
<thead>
<tr>
<th>Stars’ Colors and Temperatures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
</tr>
<tr>
<td>red</td>
</tr>
<tr>
<td>yellow</td>
</tr>
<tr>
<td>bluish-white</td>
</tr>
</tbody>
</table>

*Sequence the life cycle of a medium-sized star using the terms below to complete the graphic organizer.*

- black dwarf
- cloud of dust, gas
- expands
- giant
- medium-sized star
- shrinks
- temperature cools
- temperature rises
- white dwarf

**The Lives of Stars**

*I found this information on page __________.*
**Main Idea**

**Galaxies**

I found this information on page __________.

**The Universe**

I found this information on page __________.

---

**Details**

**Classify** the four major types of galaxies by completing the graphic organizer.

- **Barred Spiral**
  - shaped like a huge pinwheel

**Types of Galaxies**

- Barred Spiral
- __________

**Summarize** information about the makeup of the universe by filling in the blanks of the paragraph below.

Each galaxy contains __________ of stars. As many as __________ galaxies might exist. The universe seems to be continually __________. In relation to the vastness of the universe, Earth is smaller than one ________________.

**SYNTHESIZE IT**

The stars in the universe have been compared to the grains of sand on Earth. Write a sentence to explain this comparison.

__________________________________________

__________________________________________

__________________________________________

__________________________________________

---

246  The Moon, Planets, and Stars
Tie It Together

Write a Space Trip Story

You have completed a trip through the universe. Although everything in space is quite amazing, what part of space most interests you? Write a short story about a journey through your favorite part of space.
The Moon, Planets, and Stars
Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers to these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>The Moon, Planets, and Stars</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A year on Earth is the time it takes to make one revolution around the Sun.</td>
<td></td>
</tr>
<tr>
<td>• A spring tide occurs when the position of the Sun, Earth, and the Moon form a 90° angle to one another.</td>
<td></td>
</tr>
<tr>
<td>• As a comet approaches the Sun, solar radiation changes some of the ice into gas.</td>
<td></td>
</tr>
<tr>
<td>• The Sun may end its life as a black hole.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

Summarize It

After reading this chapter, identify three things you have learned about the Moon, planets, and stars.
abiotic – an environmental factor not associated with the activities of living organisms
acceleration – rate of change in velocity, usually expressed in meters per second; involves an increase or decrease in speed and/or a change in direction
air resistance – force of air on moving objects
allele – any of two or more alternate forms of a gene that an organism may have for a particular trait
amplitude – in any periodic function (e.g., a wave) the maximum absolute variation of the function
asexual reproduction – a form of reproduction in which new individuals are formed without the involvement of gametes
biodiversity – the existence of a wide range of different species in a given area or specific period of time
biotic – factors in an environment relating to, caused by, or produced by living organisms
calorie – unit of energy; the amount of heat needed to raise one gram of water one degree Celsius at standard atmospheric pressure
chemical weathering – the breakdown and alteration of rocks at or near Earth’s surface as a result of chemical processes
circuit – an interconnection of electrical elements forming a complete path for the flow of current
conduction – the transmission of heat through a medium and without the motion of the medium
conservation of energy – a fundamental principle stating energy cannot be created nor destroyed but only changed from one form to another
convection – heat transfer in a gas or liquid by the circulation of currents from one region to another
crest – the peak or highest point on a wave
Crust – outermost layer of Earth covering the mantle
dependent variable – factor being measured or observed in an experiment
deposition – the process by which sediment is carried by forces (e.g., wind, rain, or water currents) and left in a certain area
dominance – tendency of certain (dominant) alleles to mask the expression of their corresponding (recessive) alleles
ecosystem – an ecological community, together with its environment, functioning as a unit
efficiency – the relative effectiveness of a system or device determined by comparing input and output
electromagnetic radiation – the emission and propagation of the entire range of electromagnetic spectrum including: gamma rays, x-rays, ultraviolet radiation, visible light, microwaves, and radio waves
electron – a stable elementary particle that is negatively charged and orbits the nucleus of an atom
entropy – a measure of randomness or disorder of a closed system
erosion – a combination of natural processes in which materials from Earth’s surface are loosened, dissolved, or worn away and transported from one place to another
fossil fuels – the remains of animal or plant life from past geologic ages that are now in a form suitable for use as a fuel (e.g., oil, coal, or natural gas)
frequency – the number of cycles or waves per unit time
gene – a specific part of a chromosome or sequence of DNA that determines a particular feature or characteristic in an organism
heterozygous – cell or organism that has two different alleles for a particular trait
homozygous – cell or organism that has identical rather than different alleles for a particular trait
independent variable – the factor that is changed in an experiment in order to study changes in the dependent variable
inertia – the property of an object, due to its mass, by which it resists any change in its position unless overcome by force
magnetic field  the region where magnetic force exists around magnets or electric currents
mass    the amount of matter an object contains
meiosis  the process of nuclear division in cells during which the number of chromosomes is reduced by half
mitosis  a process of nuclear division in eukaryotic cells during which the nucleus of a cell divides into two nuclei, each with the same number of chromosomes
neap tide a twice-monthly tide of minimal range that occurs when the Sun, Moon, and Earth are at right angles to each other, thus decreasing the total tidal force exerted on Earth
neutral a particle, object, or system that lacks a net charge
neutron a subatomic particle having zero charge, found in the nucleus of an atom
nucleus  the center region of an atom where protons and neutrons are located; also a cell structure that contains the cell’s genetic material
ocean basin a depression on the surface of Earth occupied by water
plate tectonics theory of global dynamics in which Earth’s crust is divided into a smaller number of large, rigid plates whose movements cause seismic activity along their borders
potential energy energy stored in an object due to the object’s configuration and position
pressure the force exerted per unit area
prism a piece of glass with polished plane surfaces that disperses a beam of white light into its component colors
proton a subatomic particle having a positive charge and which is found in the nucleus of an atom
Punnett square a graphic checkboard used to determine results from a particular genetic cross
recessive an allele for a trait that will be masked unless the organism is homozygous for this trait
screw a type of simple machine that consists of an inclined plane wrapped around a cylinder
sexual reproduction reproduction involving the union of gametes producing an offspring with traits from both parents
spectroscope an instrument that uses a prism to separate and catalog light wavelengths
speed   amount of distance traveled divided by time taken; the time-rate at which any physical process takes place
spring tide the tide of increased range that occurs twice monthly at the new and full phases of the Moon
thermal energy internal energy found by adding the kinetic energy of particles making up a substance
 tropism  the motion of an organism or part of an organism toward or away from an external stimulus
trough  the lowest point on a wave
variable    an event, condition, or factor that can be changed or controlled in order to study or test a hypothesis in a scientific experiment
velocity the time-rate at which a body changes its position; defined as displacement divided by the time of travel
vibration  a repetitive movement around an equilibrium point
virus a noncellular, disease-causing particle that uses the genetic material from its host to reproduce
wavelength the distance between crests of a wave
wedge a type of simple machine that consists of an inclined plane used to separate two objects
wheel and axle a type of simple machine that consists of a rod driven through the center of a cylinder that is allowed to rotate freely, yielding a mechanical advantage equal to the cylinder’s diameter
<p>| accurate: | free from error; close to the correct amount |
| achieve: | to gain, accomplish, attain, reach |
| adapt: | to change to fit new conditions; to change in order to make suitable |
| adjacent: | near, close, or adjoining |
| adjust: | to arrange the parts of something to make it work correctly |
| adult: | fully developed; grown |
| affect: | to bring about a change in |
| apparent: | appearing to be but not necessarily so, seeming; readily seen, visible, readily understood or perceived; evident; obvious |
| approach: | to come near |
| available: | ready to use |
| capable: | able to do things; fit |
| category: | group or class of things; a division in a classification system |
| chart: | a sheet that gives information about something in the form of a diagram, graph, or table |
| chemical: | any substance used in or obtained by a chemical process |
| code: | (noun) set of signals representing letters or numerals, used to send messages; (verb) to put in the form of symbols of a code |
| collapse: | to fall together, shrink |
| communicate: | to make known or give information |
| compensate: | to make up for |
| component: | part of a machine or system |
| compound: | made up of individual parts; made of two or more separate parts or elements |
| concentrate: | to bring or come close together in one place |
| constant: | not changing; continuing |
| contact: | the act or state of touching or meeting |
| contract: | to draw together; shrink in size |
| controversy: | argument or debate |
| convert: | to change from one form or use to another; to alter the physical or chemical nature or properties of |
| coordinate: | to cause to work well together |
| cycle: | a repeating sequence of events |
| decline: | to become less in health, power, value, or number |
| definite: | clear; without doubt |
| derive: | to get or receive from a source |
| device: | tool or instrument designed for a particular purpose |
| differentiate: | to tell or see the difference |
| displace: | to take the place of or remove from the usual or proper place |
| dominate: | to have a command place; to exert mastery control, or preeminence; to control or rule |
| eliminate: | to get rid of |
| emerge: | to come out; to appear |
| enable: | to make possible; to make able; to give means or power to |
| encounter: | to meet or experience |
| enormous: | having great size |</p>
<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>erode</strong></td>
<td>to wear away</td>
</tr>
<tr>
<td><strong>estimate</strong></td>
<td>(noun) an opinion of the value, quality, size, or cost of something; (verb) to form an opinion by reasoning</td>
</tr>
<tr>
<td><strong>evaluate</strong></td>
<td>to determine the significance of something</td>
</tr>
<tr>
<td><strong>exclude</strong></td>
<td>to restrict or stop the entrance of</td>
</tr>
<tr>
<td><strong>expand</strong></td>
<td>to get bigger</td>
</tr>
<tr>
<td><strong>external</strong></td>
<td>positioned outside; beyond</td>
</tr>
<tr>
<td><strong>extract</strong></td>
<td>to take, get, or pull out</td>
</tr>
<tr>
<td><strong>factor</strong></td>
<td>a substance that functions in a body system</td>
</tr>
<tr>
<td><strong>feature</strong></td>
<td>part, appearance, or characteristic of something</td>
</tr>
<tr>
<td><strong>function</strong></td>
<td>(noun) a specific job or purpose; (verb) to carry out a specific action</td>
</tr>
<tr>
<td><strong>fundamental</strong></td>
<td>original or basic</td>
</tr>
<tr>
<td><strong>goal</strong></td>
<td>objective or end that one strives to achieve</td>
</tr>
<tr>
<td><strong>hierarchy</strong></td>
<td>a ranked series or order</td>
</tr>
<tr>
<td><strong>hypothesis</strong></td>
<td>something that is suggested as being true for the purposes of argument or of further investigation</td>
</tr>
<tr>
<td><strong>identical</strong></td>
<td>exactly the same; same as</td>
</tr>
<tr>
<td><strong>impact</strong></td>
<td>a strong, immediate effect</td>
</tr>
<tr>
<td><strong>indicate</strong></td>
<td>to make known or show; to be or give a sign of; to point out</td>
</tr>
<tr>
<td><strong>individual</strong></td>
<td>being or characteristic of a single thing</td>
</tr>
<tr>
<td><strong>initial</strong></td>
<td>of or relating to the beginning; first</td>
</tr>
<tr>
<td><strong>insert</strong></td>
<td>to put or fit (something) into something else</td>
</tr>
<tr>
<td><strong>interact</strong></td>
<td>to act upon one another; to influence one another</td>
</tr>
<tr>
<td><strong>intermediate</strong></td>
<td>in the middle or being between</td>
</tr>
<tr>
<td><strong>internal</strong></td>
<td>of or on the inside</td>
</tr>
<tr>
<td><strong>interval</strong></td>
<td>space or time between things</td>
</tr>
<tr>
<td><strong>investigate</strong></td>
<td>to search into something in order to learn the facts</td>
</tr>
<tr>
<td><strong>item</strong></td>
<td>object or thing</td>
</tr>
<tr>
<td><strong>layer</strong></td>
<td>one thickness of something over another, horizon</td>
</tr>
<tr>
<td><strong>likewise</strong></td>
<td>in the same way</td>
</tr>
<tr>
<td><strong>mechanism</strong></td>
<td>part or piece of machinery</td>
</tr>
<tr>
<td><strong>medium</strong></td>
<td>substance through which a force or effect is transmitted</td>
</tr>
<tr>
<td><strong>method</strong></td>
<td>particular procedure, technique, or way to do something; a process</td>
</tr>
<tr>
<td><strong>neutral</strong></td>
<td>neither negative nor positive</td>
</tr>
<tr>
<td><strong>normal</strong></td>
<td>conforming to a type, standard, or regular pattern</td>
</tr>
<tr>
<td><strong>nuclear</strong></td>
<td>of or relating to the atomic nucleus</td>
</tr>
<tr>
<td><strong>obtain</strong></td>
<td>to get through effort; gain</td>
</tr>
<tr>
<td><strong>occur</strong></td>
<td>to happen; to take place</td>
</tr>
<tr>
<td><strong>overlap</strong></td>
<td>one thing extends over another</td>
</tr>
<tr>
<td><strong>parallel</strong></td>
<td>everywhere the same distance apart</td>
</tr>
<tr>
<td><strong>passive</strong></td>
<td>induced by an outside agent</td>
</tr>
<tr>
<td><strong>perceive</strong></td>
<td>to observe or become aware of through the senses</td>
</tr>
<tr>
<td><strong>percent</strong></td>
<td>in, to, or for every one hundred</td>
</tr>
<tr>
<td><strong>period</strong></td>
<td>a repeating interval; row of the periodic table</td>
</tr>
<tr>
<td><strong>phenomenon</strong></td>
<td>any fact, condition, or happening that can be seen, heard, etc. and described in a scientific way</td>
</tr>
</tbody>
</table>
positive: real and numerically greater than zero
predict: to tell what one thinks will happen in the future; to foretell in advance on the basis of observation, experience, or scientific reason
principle: basic generalization that is accepted as true and that can be used as a basis for reasoning
process: series of changes by which something develops; series of changes that leads to a result
promote: to contribute to the growth of; to help bring into being
random: haphazard course; without definite aim, direction, rule, or method; lacking a definite plan, purpose, or pattern
ratio: relation of one thing to another in size or amount
react: to act because something has happened; to respond
recover: to get back something that has been lost
refine: to separate from impurities
regulate: to control according to rules or a system
reject: to refuse to accept or use
release: to set free; to let go
require: to be in need of
resource: something that lies ready for use or that can be drawn on for aid or to take care of a need
respond: to react to a stimulus
reveal: to make known; to show or display
rigid: not bending or moving; stiff and hard
section: one of several parts that together make up a whole
sequence: series; an order of events; one thing following another in a fixed order
series: a number of similar things coming one after another
significant: important; having meaning or effect
similar: having many but not all qualities in common; almost, but not exactly the same
source: that from which something comes into existence, develops, or derives; a thing or place from which something comes or is obtained
sphere: a round body, such as a ball, on which all points are the same distance from the center
stable: firmly established; not changing or fluctuating; not easily moved or changed
strategy: plan, scheme, or system
structure: arrangement of parts or the way parts are arranged
survey: to look at or study in detail
symbol: something that represents something else
technology: use of science for practical reasons, especially in engineering and industry
temporary: not permanent or lasting
theory: explanation of things or events based on scientific knowledge resulting from many observations and experiments; a group of ideas or principles that explain why or how something happens
transfer: to carry or send from one person, place, or position to another
transform: to change the condition, nature, or function of; to convert

transport: to carry from one place to another

trend: a general movement or tendency

undergo: to go through; have happen to one

underlie: to lie beneath

unique: being the only one; unusual; remarkable

vary: to change; to make or become different

version: variant of an original

visible: able to be seen; perceptible with the eye

voluntary: acting, done, or given of one’s own free will; by choice

widespread: widely scattered or prevalent