About the Consultant

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## FCAT Vocabulary Glossary

## Florida Science Academic Vocabulary Glossary
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.
This note-taking guide is designed to help you succeed in learning science content. Each chapter includes:

### Language-Based Activities
Activities cover the content in your science book including vocabulary, writing, note-taking, and problem solving.

### Anticipation Guide/KWL Charts
Think about what you already know before beginning a lesson and identify what you would like to learn from reading.

### Writing Activities
These activities help you think about what you're learning and make connections to your life.

### 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.

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

The characteristics of a population include the size of the population, \[\text{characteristic 1}\] and \[\text{characteristic 2}\].

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

Organism is caught. -> Organism is tagged. -> Organism is released. -> Organism is evaluated. -> Organism is caught again.

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

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.

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.
Before You Read

Preview the chapter title, section titles, and section headings. List at least two ideas 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

Describe the most interesting science activity you’ve ever done. Identify as many parts of the scientific process used in the activity as you can.

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Describe the most interesting science activity you’ve ever done. Identify as many parts of the scientific process used in the activity as you can.
Skim the headings in Section 1. Write three questions that come to mind from reading these headings. Look for answers to each question as you read the section.

1. 
2. 
3. 

Define observation to show its scientific meaning.

observation

Use each key term in a sentence to show it scientific meaning.

science

scientist

technology

Use a dictionary to define investigate.

investigate
Main Idea

Scientific Inquiry
Identify three ways scientists find answers about the natural world.

1. ____________________________
2. ____________________________
3. ____________________________

Using Prior Knowledge
I found this information on page ____________.

Sequence the steps that scientists take to form theories.

Scientists use __________________________ to make predictions about what will happen in investigations.

Scientists test __________________________.

Scientists form __________________________ when predictions have been well-tested.

Using Science Every Day
Compare ways that people seek answers to questions in daily life with ways that scientists seek answers to their questions.

I found this information on page ____________.
Identify five information resource materials.

1. ____________________  4. ____________________
2. ____________________  5. ____________________
3. ____________________

Complete the graphic organizer to identify scientific skills.

Skills that Scientists Use

Summarize seven kinds of information you should record in a science journal.

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________

Connect It
Describe a news item you have heard or read about scientific methods being used in society.
The Nature of Science and Technology

Section 2 Doing Science

Benchmarks—SC.H.1.3.4: The student knows that accurate record keeping, openness, and replication are essential to maintaining an investigator’s credibility with other scientists and society. Also covers: SC.H.1.3.1, SC.H.1.3.2, SC.H.1.3.5, SC.H.1.3.6, SC.H.1.3.7, SC.H.3.3.5

Predict three things that might be discussed in Section 2 as you skim the title and headings.

1. 
2. 
3. 

Define experiment to show its scientific meaning.

experiment 

Write the correct vocabulary term next to each definition.

standard used for comparison of test results in an experiment
answers scientific questions through observation
represents something that is too big, too small, too dangerous, too time consuming, or too expensive to observe directly
testing a hypothesis by using carefully controlled steps
variable that does not change when other variables change
factor that changes as a result of changes in the other variables
factor that, as it changes, affects the measure of another variable
prediction or statement that can be tested
ways, or steps to follow, to solve problems

Use a dictionary to define method to show its scientific meaning.
**Main Idea**

**Solving Problems**

I found this information on page ________.

---

**Details**

**Complete** the concept map about the 2 types of research used to solve problems.

**Types of Research**

- Descriptive research
  - used to solve problems by

---

**Describe** each part of descriptive research listed below.

1. Research objective: ____________________________
   ____________________________

2. Research design: ____________________________
   ____________________________

3. Bias: ____________________________
   ____________________________

**Identify** six reasons scientists often use models rather than direct observation. List the reasons beneath the correct heading.

<table>
<thead>
<tr>
<th>Models are used to study things that are . . .</th>
<th>Models are used to study things that happen . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Descriptive Research**

I found this information on page ________.

---

**Equipment, Materials, and Models**

I found this information on page ________.

---

"The Nature of Science and Technology"
Skim the Data and Draw Conclusions sections. Then complete each statement to summarize the main ideas.

1. Data can be recorded and organized by using ____________
   ____________________________________________________________________

2. When drawing conclusions about data, you decide ____________
   ____________________________________________________________________

3. After an investigation ends, scientists often ____________
   ____________________________________________________________________

Sequence the steps involved in experimental research design.

1. Form a(n) ____________.

2. Plan and perform a(n) ____________.

   One variable, called the ____________, is changed.
   Measure the change in the ____________ and make sure the rest of the variables are ____________.

3. ____________ the experiment to make sure results are valid.

4. ____________ the results.

How might sharing your research results with others help you?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
The Nature of Science and Technology

Section 3 Science, Technology, and Engineering

Scan the section. Use the checklist below.

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

Write two facts about science, technology, and engineering.

1. ________________________________
2. ________________________________

Define process as a verb.

process

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

biotechnology

engineer

constraint

pilot plant

Use a dictionary to define communicate.

communicate
Main Idea

Scientific Discoveries
I found this information on page _________.

Summarize how scientific discoveries influence your daily life. Include examples.

The Concept of Technology
I found this information on page _________.

Complete the graphic organizer to describe technology.

Biotechnology and the Human Body
I found this information on page _________.

Define biotechnology and evaluate how it benefits people.
Section 3 Science, Technology, and Engineering (continued)

Main Idea

What is engineering?
I found this information on page __________.

Finding Scientific Solutions
I found this information on page __________.

Details

Complete the chart about engineers.

<table>
<thead>
<tr>
<th>Engineers</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are some specific jobs done by engineers?</td>
</tr>
<tr>
<td>What are some fields in which engineers work?</td>
</tr>
</tbody>
</table>

Sequence the steps taken by scientists and engineers to find solutions to human needs or problems.

- Clearly define _____________________________.
- Search for _____________________________.
- Evaluate
  1. _____________________________
  2. _____________________________
- _________ the solution, often by building a _____________.

SYNTHESIZE IT

Identify a problem that you encounter in your everyday life that you think could be solved by using technology. Apply the steps that engineers use to search for and evaluate possible solutions.

__________________
Tie It Together

Suppose you are going to interview an engineer. Prepare five interview questions about the engineer’s work, equipment, and methods.

Interview Questions

1. 

2. 

3. 

4. 

5. 
The Nature of Science and Technology  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 you have learned about science and technology.

__________________________

__________________________

__________________________
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>Properties and Changes of Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Melting and freezing are physical properties.</td>
<td></td>
</tr>
<tr>
<td>• Color, density, and solubility change depending on the amount of material.</td>
<td></td>
</tr>
<tr>
<td>• Exploding fireworks are examples of a chemical change.</td>
<td></td>
</tr>
<tr>
<td>• When a substance undergoes a physical change, its identity remains the same.</td>
<td></td>
</tr>
</tbody>
</table>

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

Think about what happens when you crack a glow stick. What types of changes are you observing?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
Properties and Changes of Matter

Section 1 Physical and Chemical Properties

**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 matter.

**Write three facts you discovered about physical and chemical properties of matter as you scanned this section.**

1. 

2. 

3. 

**Define** matter to show its scientific meaning and then use the term in an original sentence.

- matter

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

- physical property

- chemical property

**Use a dictionary to define differentiate to show its scientific meaning.**

- differentiate

---

**New Vocabulary**

**Academic Vocabulary**
Main Idea

Physical Properties

I found this information on page ________.

Details

Organize information about physical properties of matter in the graphic organizer. Identify and describe each property.

Size-Dependent Properties

- volume: the amount of space in an object

- [ ]

- [ ]

- [ ]

- [ ]

- [ ]

- [ ]

Size-Independent Properties

- [ ]

- [ ]

- [ ]

- [ ]

- [ ]

- [ ]

- [ ]
Section 1 Physical and Chemical Properties (continued)

Main Idea

Physical Properties
I found this information on page ___________.

Chemical Properties
I found this information on page ___________.

Details

Distinguish substances by their physical properties. Use the chart in your book to identify each substance below.

<table>
<thead>
<tr>
<th>Substance</th>
<th>State</th>
<th>Density (g/cm³)</th>
<th>Melting Point (°C)</th>
<th>Boiling Point (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>liquid</td>
<td></td>
<td>3.12</td>
<td>-7.0</td>
<td>59.0</td>
</tr>
<tr>
<td>solid</td>
<td></td>
<td>4.93</td>
<td>113.5</td>
<td>184.0</td>
</tr>
<tr>
<td>solid</td>
<td></td>
<td>2.044</td>
<td>360</td>
<td>1,322.0</td>
</tr>
<tr>
<td>liquid</td>
<td></td>
<td>1.0</td>
<td>0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Summarize chemical properties by completing the concept map.

Chemical Properties

1. definition
2. three examples
3. 

CONNECT IT

Suppose that you were given a sample of an unknown liquid substance. Which physical properties would be easiest to identify? Which would be most difficult? Support your reasoning with specific examples.
Properties and Changes of Matter
Section 2 Physical and Chemical Changes

Benchmarks—SC.A.1.3.5: The student knows the difference between a physical change in a substance and a chemical change. Also covers: SC.H.1.3.1, SC.H.1.3.3, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.7, SC.H.3.3.5

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

1. ____________________________________________________________
2. ____________________________________________________________
3. ____________________________________________________________

Define solution to show its scientific meaning.

solution

Use your book to define the following terms. Then use the term in a sentence.

vaporization

sublimation

deposition

Use a dictionary to define undergo. Use the term in a scientific sentence.

undergo
Section 2 Physical and Chemical Changes (continued)

Main Idea

Physical Changes

I found this information on page _________.

Details

Complete the table about two physical changes.

<table>
<thead>
<tr>
<th>Physical Change</th>
<th>What Happens</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing shape</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissolving</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Distinguish four types of changes of state. Define each type of change, and give an example.

<table>
<thead>
<tr>
<th>Type and Definition</th>
<th>Example</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>
</tbody>
</table>

Summarize how a chemical change is different from a physical change. Complete the paragraph.

In a physical change, __________________________ changes, but __________________________ does not. In a chemical change, __________________________.

Rusting is one example of a __________________________ in which __________________________ react with __________________________ to form __________________________.
**Main Idea**

### Signs of Chemical Changes

I found this information on page _________.

**Details**

Identify five signs of chemical change.

1. ______________________
2. ______________________
3. ______________________
4. ______________________
5. ______________________

### Chemical Versus Physical Change

I found this information on page _________.

Classify each of the following events as a physical change or a chemical change.

1. A tree is cut into lumber.
2. Copper is bent.
3. Marble dissolves in acid rain.
4. Wood is burned.

### Conservation of Mass

I found this information on page _________.

Analyze how conservation of mass applies to a burning candle.

---

**EVALUATE IT**

A glass of water is placed on a very sensitive scale and several antacid tablets are dropped into the water. The weight of the glass and its contents is less after the tablets dissolve than before the tablets dissolved. Explain how matter is conserved in this example.

---

Name ________________________________ Date ____________

Section 2  Physical and Chemical Changes (continued)
Properties and Changes of 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>Properties and Changes of Matter</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Melting and freezing are physical properties.</td>
<td></td>
</tr>
<tr>
<td>• Color, density, and solubility change depending on the amount of material.</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 you have learned about properties and changes of matter.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

20 Properties and Changes of Matter
Inside the Atom

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

Before You Read

Preview the chapter title, section titles, and section headings. List at least two ideas 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.

Describe, based on your current knowledge, what an atom is.

Describe, based on your current knowledge, what an atom is.
Preview the title and headings of Section 1. Predict three topics that will be discussed in the section.
1. 
2. 
3. 

Define matter to show its scientific meaning.

Review Vocabulary

matter

New Vocabulary

electrode with a positive charge
region surrounding the nucleus in which electrons travel
electrode with a negative charge
particle in the nucleus of an atom that has the same mass as a proton and is electrically neutral
fast-moving, positively charged bit of matter
positively charged particle present in the nucleus of all atoms
negatively charged particle located outside the nucleus of an atom
matter made up of only one type of atom

Use a dictionary to define theory.

theory
Section 1 Models of the Atom (continued)

Main Idea

First Thoughts
I found this information on page ________.  

A Model of the Atom
I found this information on page ________.

Discovering Charged Particles
I found this information on page ________.

Details

Summarize early ideas about the structure of matter.

Organize Dalton’s ideas about matter. Complete the concept web.

Discovering Charged Particles

Summarize the following cathode ray tube experiments.
Crookes’s experiments

Thomson’s experiments

Inside the Atom 23
Section 1 Models of the Atom (continued)

**Main Idea**

**Rutherford’s Experiments**

*Identify what Rutherford expected to happen and what actually happened.*

**Details**

**Analyze** Rutherford’s gold foil experiments. *Identify what Rutherford expected to happen and what actually happened.*

The experiment:

Expected result:

Actual result:

Conclusion:

**A Model with a Nucleus and Further Developments**

*Describe the following improvements to atomic theory.*

<table>
<thead>
<tr>
<th>After Rutherford’s model, how the extra mass in the nucleus was explained</th>
<th>How electrons are thought to move in the most current atomic model</th>
</tr>
</thead>
</table>

**Connect It**

Explain how the development of atomic models demonstrates the scientific process.
Inside the Atom
Section 2 The Nucleus

Benchmarks—SC.A.2.3.2: The student knows the general properties of the atom and accepts that single atoms are not visible. Also covers: SC.H.1.3.1, SC.H.1.3.2, SC.H.1.3.3, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.6, SC.H.3.3.1, SC.H.3.3.4, SC.H.3.3.5, SC.H.3.3.6, SC.H.3.3.7

Read the What You’ll Learn statements. Rewrite each as a question. Then look for the answers as you read.

1. 
2. 
3. 

Use atom in a sentence to show its scientific meaning.

atom

Use your book to define each vocabulary term.

atomic number

isotope

mass number

radioactive decay

transmutation

beta particle

half-life

Use a dictionary to define stable as an adjective.

stable
Section 2 The Nucleus (continued)

**Main Idea**

**Identifying Numbers**

I found this information on page _________.

**Details**

**Complete** the chart to compare three isotopes of carbon.

<table>
<thead>
<tr>
<th></th>
<th>Carbon-12</th>
<th>Carbon-13</th>
<th>Carbon-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atomic number</td>
<td></td>
<td></td>
<td></td>
</tr>
<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** what the strong nuclear force does.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

**Radioactive Decay**

I found this information on page _________.

**Analyze** radioactive decay that is caused by the loss of alpha particles.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

**Sequence** the steps of radioactive decay through which a beta particle is released. Complete the flow chart.

- Neutron becomes unstable.
- The electron _____________
- _______________________
- _______________________
- _______________________
- _______________________
- _______________________
- _______________________

- The proton ______________
- _______________________
- _______________________

_________________________.
Complete the table to show how the mass of a sample changes during radioactive decay. Then define half-life.

<table>
<thead>
<tr>
<th>Time elapsed</th>
<th>Start</th>
<th>First Half-life</th>
<th>Second Half-life</th>
<th>Third Half-life</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>20 g</td>
<td>8 days</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

half-life: __________________________

Identify uses and hazards of radioactive material.

Uses

Hazards

Radioactive material

Summarize how synthetic radioactive isotopes are made.

CONNECT IT

Compare and contrast radioactive decay and the making of synthetic elements.

Name ___________________________________________ Date ____________

Section 2 The Nucleus (continued)

Main Idea

Rate of Decay

I found this information on page ____________.

Making Synthetic Elements

I found this information on page ____________.
Inside the Atom  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. Compare your previous answers with these.

<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.

---

28  Inside the Atom
Forces and Changes in Motion

Before You Read

Preview the chapter and section titles and the section headings. Complete the first two columns of the table by listing at least two ideas for each section in each column.

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

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

Science Journal

List three questions that you would ask an astronaut about space flight.

---

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Scan Section 1 of your book.

- Read all section titles.
- Read all bold words.
- Read all charts and graphs.
- Look at all the pictures and read their captions.
- Think about what you already know about motion.

Write two facts that you discovered about motion as you scanned the section.

1. ____________________________

2. ____________________________

Define meter in a sentence to show its scientific meaning.

Meter ____________________________

Match the vocabulary term to the correct definition.

---

[Blank]

distance and direction between starting and ending positions

[Blank]

displacement divided by time

[Blank]

distance divided by time

[Blank]

change in velocity divided by the amount of time required for the change to occur

Use a dictionary to define initial.

Initial ____________________________
Section 1 Motion (continued)

- Main Idea -

What is motion?

*I found this information on page _________.*

Details

**Create** an original drawing that shows the difference between distance and displacement. Then explain the difference between these terms in the spaces provided.

*I found this information on page _________.*

**Speed**

*I found this information on page _________.*

Complete the mathematical equation to show how speed is calculated.

speed (in meters/second) = __________ (in meters) / __________ (in seconds)

OR

\[ s = \] __________

Distinguish between speed, constant speed, and instantaneous speed.

Speed: __________

Constant speed: __________

Instantaneous speed: __________
Organize information by placing each phrase in the Venn diagram.

- how fast displacement changes
- rate of change
- how fast distance changes

Complete the equation to show how velocity is calculated.

\[ \text{velocity} = \frac{\text{distance}}{\text{time}} \]

Complete the graphic organizer by listing the 2 factors that affect acceleration.

- Acceleration is a change in ________ and/or ________

Identify examples of when you may have used information about speed, distance, or displacement in your everyday life.

- 
- 
- 
- 
-
Forces and Changes in Motion

Section 2 Forces and Motion

Benchmarks—SC.C.3.4.2: The student knows that many forces act at a distance. Also covers: SC.A.1.3.2, SC.C.2.3.2, SC.C.2.3.3, SC.C.2.3.6, SC.C.2.3.7, SC.H.1.3.5

Predict three things that might be discussed in this section after reading its headings.
1. ____________________________________
2. ____________________________________
3. ____________________________________

Define mass to show its scientific meaning.

mass

Use your book to define the key terms.

force

gravity

friction

air resistance

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

individual
Summarize forces by completing the list below.

1. A force is ____________________.
2. Every force has ____________________.
3. Every force has ____________________.

Identify the net force applied to the objects in the diagrams below.

<table>
<thead>
<tr>
<th>Force 1 = 15 N</th>
<th>Force 2 = 10 N</th>
<th>Net force = 25 N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force 1 = 10 N</td>
<td>Force 2 = 10 N</td>
<td>Net force = _____</td>
</tr>
<tr>
<td>Force 1 = 10 N</td>
<td>Force 2 = 15 N</td>
<td>Net force = _____</td>
</tr>
</tbody>
</table>

Analyze the information in your book about contact and non-contact forces to complete the graphic organizer below.

- **Contact forces** affect objects that are ____________________ and include ____________________.
- **Non-contact forces** affect objects that are not ____________________ and include ____________________.
Compare the types of friction by completing the table.

<table>
<thead>
<tr>
<th>Type of Friction</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>static</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sliding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Model the buoyant force and air resistance by sketching an example of each below. Include arrows indicating the direction of the force of gravity, the buoyant force, and the force of air resistance.

The Buoyant Force

Air Resistance

CONNECT IT

Give an example of each type of friction, the buoyant force, and air resistance that you have experienced in daily life.
**Forces and Changes in Motion**

**Section 3 The Laws of Motion**

**Benchmarks**—SC.C.2.3.5: The student understands that an object in motion will continue at a constant speed and in a straight line until acted upon by a force and that an object at rest will remain at rest until acted upon by a force. Also covers: SC.C.2.3.3, SC.C.2.3.6, SC.H.1.3.5, SC.H.3.3.4

**Review Vocabulary**

Use your book or a dictionary to define inertia.

**New Vocabulary**

Define the key terms using a dictionary or your book.

1. first law of motion
2. second law of motion

**Academic Vocabulary**

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

<table>
<thead>
<tr>
<th>Analyze the objectives listed under What You’ll Learn for this section. Change the statements into questions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. _______________________________________________________</td>
</tr>
<tr>
<td>2. _______________________________________________________</td>
</tr>
<tr>
<td>3. _______________________________________________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name __________________________________________ Date ___________</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 Forces and Changes in Motion</td>
</tr>
</tbody>
</table>

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Section 3  The Laws of Motion (continued)

Main Idea

Newton’s Laws of Motion

I found this information on page _________.

The First Law of Motion

I found this information on page _________.

Details

Summarize Newton’s laws of motion.

Changes in objects’ motion are caused by ________. Newton’s laws of motion consist of ________ rules. These rules can be used to ________ the motion of ________ objects.

Model the path of a thrown ball as explained by Newton’s first law of motion. Label the arrows in the diagram with numbers to indicate:

1. the path of the ball
2. the direction of the force of gravity
3. the path that the ball would follow if the forces acting on it were balanced

Complete the graphic organizer by listing the two factors that affect acceleration.

Acceleration of an object depends on ________ and ________.
The Third Law of Motion

**Main Idea**

The Third Law of Motion

I found this information on page ___________.

**Details**

Model action and reaction forces.
- Use arrows to show action and reaction forces.
- Label the action force and the reaction force in your model.

[Blank space for model drawing]

Compare action and reaction forces with balanced forces by completing the Venn diagram below.

<table>
<thead>
<tr>
<th>Action and Reaction Forces</th>
<th>Balanced Forces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both</td>
<td></td>
</tr>
<tr>
<td>acts on Forces _____ cancel</td>
<td>acts on Forces _____ cancel</td>
</tr>
<tr>
<td>pushes or pulls</td>
<td></td>
</tr>
</tbody>
</table>

Create a drawing that shows a situation described by all three laws of motion.
- Use arrows to show the size and direction of the forces involved.
- Label your drawing to explain how each law of motion is demonstrated.

[Blank space for individual drawing]

Combining the Laws

I found this information on page ___________.

Name __________________________ Date ___________
Tie It Together

Sports and Forces

Choose a ball sport, such as baseball, soccer, or tennis. Describe the path of the ball during a brief period of play, and identify the forces and changes in motion that act on it as it follows that path. Try to include as many of the concepts presented in this chapter as possible.
Forces and Changes in Motion
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. Compare your previous answers with these.

<table>
<thead>
<tr>
<th>K What I know</th>
<th>W What I want to find out</th>
<th>L What I learned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<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 studying this chapter, identify three main concepts you have learned about motion.


40 Forces and Changes in Motion
Work and Simple Machines

Sunshine State Standards—SC.C.2: The student understands that the types of force that act on an object and the effect of that force can be described, measured, and predicted.

Before You Read

Preview the chapter and section titles and the section headings. Complete the first two columns of the table by listing at least two ideas for each section in each column.

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

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

Science Journal

Describe three machines you used today and how they made doing a task easier.

---

Work and Simple Machines 41
Work and Simple Machines
Section 1 Work and Power

Review the objectives for Section 1. Write three questions that come to mind from reading these statements. Look for answers to each question as you read the section.

1. 

2. 

3. 

Define force to show its scientific meaning.

force

New Vocabulary

Use each key term in a sentence to show its scientific meaning.

work

power

Academic Vocabulary

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

version
Main Idea

What is work?

I found this information on page _________.

Summarize what must occur for work to be done.

Details

Model the relationship between an applied force and work by sketching two drawings in the boxes provided. In the top box, show a situation in which work is done. In the bottom box, show a situation in which no work is done.

- Use arrows to show the direction of the applied force and any motion that results.
- Write a caption explaining each illustration.

Work is done.

Caption:

Work is not done.

Caption:
Main Idea

Calculating Work

I found this information on page ____________.

What is power?

I found this information on page ____________.

Complete the mathematical equation describing how work is calculated. Complete the same equation below it, using the units in which each measurement is recorded. Then write the same equation below that, using the correct symbols.

\[
\text{work} = \text{________} \times \text{________}
\]

\[
\text{joules} = \text{________} \times \text{________}
\]

\[
\text{________} = \text{________}
\]

Define the term power. Complete the mathematical equation describing how power is calculated in word and symbol form.

Power is ________________________________

\[
\text{power} = \text{________} \quad P = \text{________}
\]

Identify the unit in which power is measured.

______________________________

Summarize the way in which work, energy, and power are related by completing the paragraph below.

When you do ____________ on an object, you ____________ the energy of that object. Energy is ____________ from yourself to _____________. Power is equal to the amount of ____________ transferred over a certain _____________.

CONNECT IT

Consider an active sport. Describe the work that is done by people as they play the sport.

______________________________

______________________________

______________________________

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Predict three things that might be discussed in Section 2 after reading the headings in this section.

1. 

2. 

3. 

Define friction to show its scientific meaning.

friction

Write the correct vocabulary word next to each definition.

output work divided by input work

force exerted on a machine

number of times that a machine increases the input force; equal to the output force divided by the input force

force exerted by a machine

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

device
Main Idea

What is a machine? Mechanical Advantage

Organize information by listing the 3 ways a machine can make work easier.

A machine makes work easier by changing

1. ________________________________
2. ________________________________
3. ________________________________

Summarize mechanical advantage. Then write the formula for calculating it.

Mechanical advantage is ________________________________
______________________________

The equation for calculating mechanical advantage is

\[
\text{mechanical advantage} = \frac{\text{input force}}{\text{output force}}
\]

Analyze the 3 ways machines make work easier. Complete the table by describing the effect of the machine on the output force.

<table>
<thead>
<tr>
<th>What Machine Does</th>
<th>How Force Is Changed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increases force</td>
<td></td>
</tr>
<tr>
<td>Increases distance</td>
<td></td>
</tr>
<tr>
<td>Changes direction of force</td>
<td></td>
</tr>
</tbody>
</table>
Think of some machines that you use. List the machines and the parts that may be affected by friction.

[Blank lines for listing machines and affected parts]
Work and Simple Machines
Section 3 Simple Machines

Benchmarks—SC.C.2.3.4: The student knows that simple machines can be used to change the direction or size of a force.
Also covers: SC.H.1.3.5, SC.H.2.3.1

Scan Section 3 of your book using the checklist below.

☐ Read all section titles.
☐ Read all bold words.
☐ Read all charts and graphs.
☐ Look at all the pictures, and read their captions.
☐ Think about what you already know about machines.

Write two facts you discovered about simple machines.
1. _________________________________________
2. _________________________________________

Define the term compound to show its scientific meaning.
compound

Write the correct vocabulary word next to each definition.

a grooved wheel with a rope or cable wrapped around the groove
machine that does work only with one movement
an inclined plane that moves
a flat, sloped surface, or ramp
an inclined plane wrapped around a cylinder or post
machine made up of two or more simple machines
two circular objects of different sizes that rotate together
a rigid rod or plank that pivots about a point called the fulcrum

Define section. Use section in an original sentence to show its scientific meaning.

section
Main Idea

What is a simple machine?

Contrast simple and compound machines by completing the table.

<table>
<thead>
<tr>
<th>Simple Machine</th>
<th>Compound Machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Examples</td>
<td></td>
</tr>
</tbody>
</table>

Inclined Plane

Compare how the amount of force needed to move an object changes with the length of the inclined plane. Complete the blanks below with less, more, and the most.

Longer Inclined Plane:

_______ force is needed to move an object

Shorter Inclined Plane:

_______ force is needed to move an object

Lifting Without an Inclined Plane:

_______ force is needed to move the object

Lever

Model how changing the location of a fulcrum in a lever affects its mechanical advantage. Draw two levers of the same length but with fulcrums at different points.

- Label the input force, output force, and fulcrum in your drawings as well as the distances between the fulcrum and each force.
- Show a calculation of the mechanical advantage of each.
Main Idea

Wheel and Axle
I found this information on page _________.

Pulley
I found this information on page _________.

Details

Analyze the wheel and axle by completing the paragraph below.

If the input force is applied to the axle, the mechanical advantage is ___________ one. If the input force is applied to the wheel, the mechanical advantage is almost always ___________ one.

Classify the 3 types of pulleys by completing the table.

<table>
<thead>
<tr>
<th>Pulleys</th>
<th>Type of Pulley</th>
<th>Effect on Force</th>
<th>Mechanical Advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>_______</td>
<td>Fixed pulley</td>
<td>_________</td>
<td>_________</td>
</tr>
<tr>
<td>_______</td>
<td>Movable pulley</td>
<td>_________</td>
<td>_________</td>
</tr>
<tr>
<td>_______</td>
<td>Pulley system</td>
<td>_________</td>
<td>_________</td>
</tr>
</tbody>
</table>

Connect It

Analyze what types of wheel and axles are on a bicycle. List and describe them in terms of their mechanical advantage.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Tie It Together

Use Simple Machines

You will be loading heavy crates into a truck. The crates are too heavy to lift to the bed of the truck. Make use of as many simple machines as you can to help you. Explain how you would use them.
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>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>
<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 work and simple machines.

________________________________________

________________________________________

________________________________________

---

52  *Work and Simple Machines*
Before You Read

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

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W</th>
<th>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

Choose three devices that use electricity and identify the function of each device.

- __________________________  __________________________
- __________________________  __________________________
- __________________________  __________________________
- __________________________  __________________________
- __________________________  __________________________
Energy and Energy Resources

Section 1 What is energy?

Analyze the objectives for Section 1. Write three questions you have. Look for responses to each question as you read the section.

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

Define mass to show its scientific meaning.

mass

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

energy in the nucleus of an atom
ability to cause change
energy stored in chemical bonds
energy an object has due to its motion
energy carried by electric current
the sum of the kinetic and potential energy of the particles in a material
energy stored in an object due to its position
energy carried by electromagnetic waves

Use a dictionary to define transfer.

transfer
Name ___________________________ Date ___________

Section 1 What is energy? (continued)

Main Idea

The Nature of Energy

I found this information on page _________.

Kinetic Energy

I found this information on page _________.

Potential Energy

I found this information on page _________.

Details

Create a list of three examples of how energy causes changes that you observe in your classroom.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Organize information from your book to describe energy of motion.

Energy an object has as a result of its motion is ____________________

which increases or decreases with

Complete the graphic organizer about energy of position.

Energy an object has as a result of its position is ____________________

which increases or decreases with

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**Main Idea**

**Forms of Energy**

I found this information on page __________.

**Details**

**Synthesize** your knowledge of each form of energy by providing examples.

<table>
<thead>
<tr>
<th>Form of Energy</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal</td>
<td></td>
</tr>
<tr>
<td>Chemical</td>
<td></td>
</tr>
<tr>
<td>Radiant</td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td></td>
</tr>
</tbody>
</table>

**CONNECT IT**

Choose any three forms of energy discussed in this lesson. Explain how each form of energy is important in your daily life.

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
Energy and Energy Resources
Section 2 Energy Transformations

Benchmarks—SC.B.1.3.1: The student identifies forms of energy and explains that they can be measured and compared.
Also covers: SC.A.2.3.3, SC.B.1.3.2, SC.B.1.3.4, SC.B.1.3.5, SC.B.2.3.1, SC.H.1.3.4, SC.H.1.3.5

Preview Section 2 of your book using the checklist.

- Read all section headings.
- Read all bold words.
- Look at all of the pictures and read their labels.
- Think about what you already know about how energy changes form.

Write three facts you discovered about energy transformations as you scanned the section.

1. 
2. 
3. 

Define the vocabulary terms to show their scientific meanings.

transformation

law of conservation of energy

generator
turbine

Use a dictionary to define convert.
Main Idea

The Law of Conservation of Energy
I found this information on page _________.

Changing Kinetic and Potential Energy
I found this information on page _________.

Using Energy
I found this information on page _________.

Details

State the law of conservation of energy.

The law of conservation of energy states that _____________

___________

Model the potential and kinetic energy transformations that take place as a person tosses a ball into the air and then catches it.

- Label the points at which the ball has the greatest potential energy and the greatest kinetic energy.

Analyse the energy flow in a gasoline-powered engine and complete the diagram below.

___________

movement of engine

heating of engine

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Compare and contrast energy transformations that occur when electrical energy is generated in coal power plants with energy transformations that occur when energy is used to help you hear. Sequence steps in each process side-by-side.

<table>
<thead>
<tr>
<th>Coal Power Plants</th>
<th>Energy in Hearing</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>
</tbody>
</table>

Contrast a turbine with a generator.

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

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

Identify some points in the energy flow through a power plant that might produce unwanted forms of energy and make the plant less efficient.
Energy and Energy Resources
Section 3 Sources of Energy

Predict what you will learn in this section. Read the title. Then write two topics that might be discussed.
1. 
2. 

Review Vocabulary
Use resource in a sentence that shows its scientific meaning.
resource

New Vocabulary
Define the key terms.
nonrenewable resource

renewable resource

alternative resource

inexhaustible resource

photovoltaic

Academic Vocabulary
Use a dictionary to define percent.
percent

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Main Idea

**Energy Resources**

Identify two types of energy from the natural world that Earth’s surface receives.

1. ____________________________

   ____________________________

2. ____________________________

   ____________________________

Fossil Fuels, Nuclear Energy, and Hydroelectricity

Compare energy resources by completing the table.

<table>
<thead>
<tr>
<th>Energy Resources</th>
<th>Fossil Fuels</th>
<th>Nuclear</th>
<th>Hydroelectric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of energy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renewable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advantages</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disadvantages</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Complete the concept map by listing four alternative sources of energy.

Identify two reasons to conserve fossil fuels.

1. ____________________________________________
   ____________________________________________

2. ____________________________________________
   ____________________________________________

List three specific things you can do to conserve fossil fuels.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

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Tie It Together

Make a Concept Map

*Make a concept map that includes all of the ways energy can be generated that are mentioned in this chapter.*

Now imagine you are an energy expert on a planning council for a new town to be built on an island. Evaluate resources and/or methods you will suggest that the new town use. Justify your choices and provide possible challenges to the project.
**Energy and Energy Resources**

**Chapter Wrap-Up**

*Review the ideas that 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>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**

Summarize the main points of the chapter in a paragraph or by using a concept map.

---

64  *Energy and Energy Resources*
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>Waves, Sound, and Light</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Waves carry both matter and energy.</td>
<td></td>
</tr>
<tr>
<td>• Waves occur only in water.</td>
<td></td>
</tr>
<tr>
<td>• Sound travels at the same speed through all materials.</td>
<td></td>
</tr>
<tr>
<td>• Light does not require matter to move through.</td>
<td></td>
</tr>
</tbody>
</table>

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

Write a short paragraph describing water waves you have seen.
Waves, Sound, and Light

Section 1 Waves

Skim Section 1 in your book. Write three questions that come to mind from what you have skimmed.

1. ________________________________
2. ________________________________
3. ________________________________

Define density to show its scientific meaning.

density

Write the correct vocabulary term next to each definition.

__________________________
distance between one point on a wave and the nearest point moving with the same speed and direction

__________________________
wave that causes particles in matter to move at right angles to the direction the wave travels

__________________________
angle an incoming wave makes with the normal equals angle the reflected wave makes with the normal

__________________________
disturbance that moves through matter or space and carries energy

__________________________
change in direction of a wave when it changes speed as it travels from one material to another

__________________________
number of wavelengths that pass a given point in one second, measured in hertz

__________________________
wave that causes particles in matter to move back and forth along the direction the wave travels

__________________________
bending of waves around an object

Use a dictionary to define adjacent.

adjacent
Contrast mechanical and electromagnetic waves. Complete the paragraph below.

Mechanical waves travel through ________________. They may be ________________ waves or ________________ waves.

Electromagnetic waves travel through ________________ or _________________. They are always ________________ waves.

Create drawings of a transverse wave and a compressional wave. Label a trough, a crest, a compression, and a rarefaction.

<table>
<thead>
<tr>
<th>Traverse wave</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compressional wave</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Compare and contrast the properties of transverse and compressional waves by defining the wave characteristics for each.

<table>
<thead>
<tr>
<th>Property</th>
<th>Wave Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Transverse</td>
</tr>
<tr>
<td>Wavelength</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>Amplitude</td>
<td></td>
</tr>
</tbody>
</table>
Complete the equation for wave speed. Then rewrite the equation using the correct symbols.

\[
\text{wave speed (m/s)} = \text{ (m)} \times \text{ (Hz)}
\]

Wave Speed Equation

Model the ways waves change direction by drawing examples of light waves in the boxes below.

<table>
<thead>
<tr>
<th>Light Waves Change Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflection</td>
</tr>
<tr>
<td>Refraction</td>
</tr>
<tr>
<td>Diffraction</td>
</tr>
</tbody>
</table>

Create, label, and describe a water wave. Identify its wavelength, frequency, and amplitude. Draw what would happen if the wave is reflected, refracted, and diffracted.
Waves, Sound, and Light
Section 2 Sound Waves

Benchmarks—SC.B.1.3.6: The student knows the properties of waves; that each wave consists of a number of crests and troughs; and the effects of different media on waves. Also covers: SC.C.1.3.2, SC.H.1.3.5, SC.H.3.3.6, SC.H.3.3.7

Scan Section 2 of your book using the checklist below.

☐ Read all section titles.
☐ Read all bold words.
☐ Read all charts and graphs.
☐ Look at the pictures.
☐ Think about what you already know about sound waves.

Write three facts you discovered about sound waves as you scanned the section.

1. ______________________________________________________________________

2. ______________________________________________________________________

3. ______________________________________________________________________

Define perception to show its scientific meaning.

perception  __________________________________________________________________

New Vocabulary Write a sentence using the scientific meaning of each of the vocabulary words.

intensity  __________________________________________________________________

pitch  _____________________________________________________________________

reverberation  ______________________________________________________________________

Academic Vocabulary Use a dictionary to define perceive.

perceive  __________________________________________________________________________
Section 2 Sound Waves (continued)

Main Idea

Making Sound Waves
I found this information on page _________.

Details

Organize the features of sound waves in the table below.

<table>
<thead>
<tr>
<th>Properties of Sound Waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produced by</td>
</tr>
<tr>
<td>Type of wave</td>
</tr>
<tr>
<td>How they transfer energy</td>
</tr>
</tbody>
</table>

Identify 2 factors that affect the speed of sound.
1. __________________________________________
2. __________________________________________

Model Draw and label arrows to show whether intensity, loudness, and energy increase or decrease as the amplitude of a sound wave increases.

Amplitude increases

Intensity _________________

Loudness _________________

Energy _________________

Describe the relationship between frequency and pitch.
________________________________________________________
________________________________________________________
________________________________________________________
Main Idea

Hearing and the Ear

I found this information on page __________.

Details

Sequence the path of sound through the ear by completing the flowchart with the function and main structures of each part of the ear.

Outer Ear

Function: __________________________
Main Structures: __________________

Middle Ear

Function: __________________________
Main Structures: __________________

Inner Ear

Function: __________________________
Main Structures: __________________

Distinguish two uses of reflected sound.

1. __________________________
2. __________________________

Connect It

Sound in an empty room can be very loud, with many echoes. Describe three ways to make the room quieter.

______________________________

______________________________

______________________________

______________________________
Waves, Sound, and Light
Section 3 Light

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.1.3.3, SC.B.1.3.6, SC.H.1.3.2, SC.H.1.3.3, SC.H.1.3.5, SC.H.1.3.6, SC.H.3.3.6

Predict three things that might be discussed in Section 3. Read the section headings and subheadings to help make your predictions.

1. 
2. 
3. 

Review Vocabulary

Define spectrum and use it in a sentence.

spectrum

Use your book to define each of the new vocabulary terms.

electromagnetic waves

electromagnetic spectrum

infrared waves

ultraviolet waves

New Vocabulary

Academic Vocabulary

Use a dictionary to define interact.

Name ______________________________ Date ________________

72 Waves, Sound, and Light
Section 3 Light (continued)

**Main Idea**

**Waves in Empty Space**

I found this information on page _________.

**Properties of Light Waves**

I found this information on page _________.

**The Electromagnetic Spectrum**

I found this information on page _________.

---

**Details**

**Analyze** why light travels faster in empty space than when it travels through matter.

---

**Model** an electromagnetic wave. Draw and label both the electric and the magnetic fields, and indicate the wavelength and the direction of travel.

---

**Organize** information about the uses of electromagnetic waves.

<table>
<thead>
<tr>
<th>Wave Type</th>
<th>Used For</th>
</tr>
</thead>
<tbody>
<tr>
<td>radio waves</td>
<td></td>
</tr>
<tr>
<td>microwaves</td>
<td></td>
</tr>
<tr>
<td>infrared waves</td>
<td></td>
</tr>
<tr>
<td>visible light</td>
<td></td>
</tr>
<tr>
<td>ultraviolet waves</td>
<td></td>
</tr>
<tr>
<td>X rays</td>
<td></td>
</tr>
<tr>
<td>gamma rays</td>
<td></td>
</tr>
</tbody>
</table>
**Main Idea**

**The Eye and Seeing Light**

*I found this information on page __________.*

**Details**

**Sequence** the path of light through the eye and organize the structures involved at each step.

- **Light enters eye**
  - Main Structures:
  
- **Light waves are focused**
  - Main Structures:
  
- **Image formed**
  - Main Structures:
  
- **Carries messages to brain**
  - Main Structures:

**Summarize** what determines the color of objects that emit light and what determines the color of objects that do not.

I found this information on page __________.

**Contrast** the roles of rods and cones. Complete the table.

<table>
<thead>
<tr>
<th>Cell</th>
<th>Sensitive to</th>
</tr>
</thead>
<tbody>
<tr>
<td>rod</td>
<td></td>
</tr>
<tr>
<td>cone</td>
<td></td>
</tr>
</tbody>
</table>

**Synthesize It**

Think of a source of electromagnetic waves, such as a radio station or a microwave oven. Describe the waves given off by the source, including their wavelength and frequency.

I found this information on page __________.
Identify ways that sound waves, visible light waves, and other types of electromagnetic waves play a role in your daily life. For each type of wave, give an example of when the waves are useful. Identify any problems the waves can cause.

**Sound Waves**

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

**Visible Light**

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

**Other Types of Electromagnetic Waves**

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Waves, Sound, and Light

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, Sound, and Light</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Waves carry both matter and energy.</td>
<td></td>
</tr>
<tr>
<td>• Waves occur only in water.</td>
<td></td>
</tr>
<tr>
<td>• Sound travels at the same speed through all materials.</td>
<td></td>
</tr>
<tr>
<td>• Light does not require matter to move through.</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.
Rocks and Minerals

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>Rocks and Minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Minerals are made by people.</td>
<td></td>
</tr>
<tr>
<td>• Most rocks consist of one or more minerals.</td>
<td></td>
</tr>
<tr>
<td>• Rocks are classified in three major groups.</td>
<td></td>
</tr>
<tr>
<td>• Rocks have stopped forming on Earth.</td>
<td></td>
</tr>
<tr>
<td>• Rocks and minerals have many uses in society.</td>
<td></td>
</tr>
</tbody>
</table>

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

Science Journal

Observe a rock or mineral sample. Write three characteristics about it.
Rocks and Minerals

Section 1 Minerals—Earth’s Jewels

Scan Section 1 of your book. Then, write three questions that you have about minerals. Try to answer your questions as you read.

1. 
2. 
3. 

Define physical property to show its scientific meaning.

physical property


New Vocabulary

Write the correct vocabulary word from your book next to each definition.

a solid material that has an orderly, repeating pattern of atoms

a mineral that contains enough of a useful substance that it can be mined at a profit

a rare, valuable mineral that can be cut and polished to give it a beautiful appearance

a solid that is usually made up of two or more minerals

Academic Vocabulary

Use a dictionary to find the definition of the word refine.

Write the definition below in your own words.

refine
Section 1 Minerals—Earth’s Jewels (continued)

Main Idea

What is a mineral?

I found this information on page __________.

Properties of Minerals

I found this information on page __________.

Details

Complete the table below about minerals.

<table>
<thead>
<tr>
<th>Minerals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition:</td>
<td></td>
</tr>
<tr>
<td>Examples:</td>
<td></td>
</tr>
<tr>
<td>Ways minerals form:</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Contrast cleavage and fracture by writing three different characteristics of each in the following chart.

<table>
<thead>
<tr>
<th>Cleavage</th>
<th>Fracture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contrast the qualities of mineral color and luster.

Color

Luster
Sequence four steps that describe how copper ore is turned into useful products. The first step has been completed for you.

1. Copper ore is mined and crushed.
2. 
3. 
4. 

List characteristics of a gem and an ore in the table below.

<table>
<thead>
<tr>
<th>Gem</th>
<th>Ore</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>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connect It

Write the names of six objects in your classroom that are made using minerals. Then explain how minerals are important in your everyday life.

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


Rocky and Minerals

Section 2 Igneous and Sedimentary Rocks

Benchmarks—SC.D.1.3.5: The student understands concepts of time and size relating to the interaction of Earth’s processes. Also covers: SC.D.1.3.1, SC.D.1.3.2, SC.D.1.3.3, SC.H.3.3.6

Skim the headings in Section 2. Then make three predictions about what you will learn.

1. ____________________________
2. ____________________________
3. ____________________________

Define the following terms using your book or a dictionary.

lava

igneous rock

extrusive

intrusive

sedimentary rock

category

Review Vocabulary

New Vocabulary

Academic Vocabulary

Name ____________________________ Date ____________
Main Idea

Igneous Rocks

I found this information on page ________.

Details

Contrast extrusive and intrusive igneous rocks in the table.

<table>
<thead>
<tr>
<th>Igneous Rocks</th>
<th>Form from molten rock called</th>
<th>Have cooling rate that is</th>
<th>Have crystal size that is</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extrusive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrusive</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Organize a concept map about igneous rocks using these words and phrases.

- high silica content
- low silica content
- granitic
- dark colored

I found this information on page ________.
Section 2  Igneous and Sedimentary Rocks (continued)

Main Idea

Sedimentary Rocks

Classify sedimentary rocks by some of their characteristics.

<table>
<thead>
<tr>
<th>Form from</th>
<th>Detrital</th>
<th>Chemical</th>
<th>Organic</th>
</tr>
</thead>
<tbody>
<tr>
<td>How form</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where form</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examples</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Choose a sedimentary or igneous rock. You might pick basalt, granite, shale, or sandstone. Write a story from the rock’s perspective about how the rock formed. When writing your story, you should pretend that you are the rock.

CONNECT IT

Rocks and Minerals 83
Rocks and Minerals
Section 3 Metamorphic Rocks and the Rock Cycle

Scan the headings in Section 3. Write three predictions about what you will learn in this section.

1. 
2. 
3. 

Define each vocabulary word. Then, write a sentence reflecting the scientific meaning of each of the words.

pressure

metamorphic rock

foliated

nonfoliated

rock cycle

cycle

New Vocabulary

Review Vocabulary

Academic Vocabulary
Main Idea

New Rock from Old
I found this information on page __________.

Summarize the conditions under which rocks experience metamorphism as you complete the table below.

<table>
<thead>
<tr>
<th>Conditions of Metamorphic Rock Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
</tr>
<tr>
<td>Pressure</td>
</tr>
<tr>
<td>Time</td>
</tr>
</tbody>
</table>

Draw a metamorphic rock with a foliated texture and a metamorphic rock with a nonfoliated texture below. Show and label two characteristics of each type of rock in the top boxes, and list an example of each type in the bottom boxes.

<table>
<thead>
<tr>
<th>Foliated texture</th>
<th>Nonfoliated texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples:</td>
<td>Examples:</td>
</tr>
</tbody>
</table>
Main Idea

Rock Cycle
I found this information on page __________.

Create a diagram of the rock cycle below.
• Label each type of rock in your diagram.
• Label the processes in your diagram. Use the words melting, cooling, weathering and erosion, compaction and cementation, and heat and pressure.

Details

Identify two other cycles that occur in nature.
1. ______________________________________________________
2. ______________________________________________________

CONNECT IT

While on a leisurely hike, a geologist from the nearby university noticed that the gravel in a sedimentary rock consists of pieces of both igneous and metamorphic rock. As the geologist, write a brief report explaining how this is possible.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

86 Rocks and Minerals
Tie It Together

Design

Some artists specialize in making art from rock and mineral pieces. The different colors, textures, and other properties of the rocks and minerals can produce spectacular displays. In the space below, design your own rock and mineral art. It might be mounted on a wall, make up the courtyard of a building, or be a large monument. You may use any rock or mineral shown in your book in your art.
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.

### Rocks and Minerals

<table>
<thead>
<tr>
<th>Rocks and Minerals</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Minerals are made by people.</td>
<td></td>
</tr>
<tr>
<td>• Most rocks consist of one or more minerals.</td>
<td></td>
</tr>
<tr>
<td>• Rocks are classified in three major groups.</td>
<td></td>
</tr>
<tr>
<td>• Rocks have stopped forming on Earth.</td>
<td></td>
</tr>
<tr>
<td>• Rocks and minerals have many uses in society.</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 rocks and minerals.

---

88  *Rocks and Minerals*
Clues to Earth’s Past

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>Clues to Earth’s Past</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The footprint of a dinosaur is considered a fossil.</td>
<td></td>
</tr>
<tr>
<td>• Scientists use fossils to learn what an environment was like long ago.</td>
<td></td>
</tr>
<tr>
<td>• The oldest rock layer is always the one found on top.</td>
<td></td>
</tr>
<tr>
<td>• Scientists can determine the age of some rocks.</td>
<td></td>
</tr>
</tbody>
</table>

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

**Science Journal**

List three fossils that you would expect to find a million years from now in the place you live today.
Clues to Earth’s Past
Section 1 Fossils

Benchmarks—SC.D.1.3.2: The student knows that . . . organisms are growing, dying, and decaying as new organisms are produced by the old ones. Also covers: SC.B.2.3.2, SC.D.1.3.1, SC.D.1.3.3, SC.D.1.3.5

**Skim** Section 1 of your book. Read the headings and examine the illustrations. Write three questions that come to mind.

1. 
2. 
3. 

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

**Define** the following terms to show their scientific meaning.

- paleontologist
- permineralized remains
- carbon film
- cast
- index fossils

**Define** emerge to show its scientific meaning.
Section 1 Fossils (continued)

**Main Idea**

**Formation of Fossils**
*I found this information on page ___________.*

**Types of Preservation**
*I found this information on page ___________.*

**Details**

**Complete** the table to describe the 2 conditions that improve the chances of fossil formation. Give an example of each.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Create** a concept web to summarize the types of preservation.

**Sequence** the steps involved in the making of the cast of a shell.

- Sediment buries shell.
- Mold results.
- Cast results.
Main Idea

Index Fossils

I found this information on page __________.

Details

Summarize the 3 characteristics of index fossils.

1. ____________________________

2. ____________________________

3. ____________________________

Analyze why index fossils are more useful to paleontologists than many other fossils.

Organize the kinds of information about ancient environments that scientists can learn from fossils. Complete the graphic organizer.

Information about environment revealed by fossils

CONNECT IT
You find a fossil shell in a layer of rock. It appears to be a clam. What type of rock must the rock layer be? What type of environment would the animal have lived in?

92 Clues to Earth’s Past
Clues to Earth’s Past

Section 2 Life and Geologic Time

Benchmarks—SC.D.1.3.5: The student understands concepts of time and size relating to the interaction of Earth’s processes.
Also covers: SC.D.1.3.2, SC.D.1.3.3

Skim the headings in Section 1. Predict two topics that will be covered in this section.

1. ____________________________________________
2. ____________________________________________

Define adaptation.

adaptation

Use your book to define each term. Then write a sentence that uses the term in its scientific meaning.

gologic time scale

trilobite

Use a dictionary to define respond.

respond
Main Idea

Geologic Time

I found this information on page ________.

Details

Analyze how scientists divide time into units. Fill in the blanks.

Scientists use __________ containing __________ to subdivide geologic time. How finely geologic time can be divided depends on ____________________________.

Distinguish the units of geologic time. Give examples of each.

Longest subdivision: ____________________________

Based on: ____________________________________

Examples: ____________________________________

Second-longest subdivision: ____________________________

Based on: ____________________________________

Examples: ____________________________________

Third-longest subdivision: ____________________________

Based on: ____________________________________

Examples: ____________________________________

Fourth-longest subdivision: ____________________________

Based on: ____________________________________

Examples: ____________________________________

Identify when each development in Earth’s history occurred.

<table>
<thead>
<tr>
<th>Event</th>
<th>Eon (if identified)</th>
<th>Era (if identified)</th>
<th>Period (if identified)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First life</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First trilobites</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First flowering plants</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Different types of trilobites lived in different times during the Paleozoic Era. How could scientists use these fossils to determine the times during which other organisms lived?
Clues to Earth’s Past
Section 3 Relative Ages of Rocks

Scan the list below to preview Section 2 of your book.

- Read all section headings.
- Read all bold words.
- Look at all of the pictures.
- Think about what you already know about rock.

Write three facts you discovered about the relative ages of rocks as you scanned the section.

1. ______________________________________________________
2. ______________________________________________________
3. ______________________________________________________

Define sedimentary rock to show its scientific meaning.

states that in undisturbed rock layers, the oldest rocks are on the bottom and the rocks are progressively younger toward the top age of something compared with the ages of other things gap in a sequence of rock layers that is due to erosion or periods without any deposition

Define sequence to show its scientific meaning.

__________________________________________________________
Model the principle of superposition by sketching a cross-section of layers of undisturbed sedimentary rock. Number the layers, starting with 1 for the oldest layer.

Describe how the relative age of a rock layer is different from the actual age of the rock layer.

Model how a folded rock formation containing limestone, coal, and sandstone would form. Draw and label the layers as they would form originally. Then draw what they would look like after being folded.
Section 3 Relative Ages of Rocks (continued)

Main Idea

Unconformities
I found this information on page __________.

Compare and contrast angular unconformity, disconformity, and nonconformity in rocks by sequencing the steps in their formation.

<table>
<thead>
<tr>
<th>Unconformities</th>
<th>Type</th>
<th>How It Forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angular unconformity</td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>Disconformity</td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>Nonconformity</td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Matching Up Rock Layers
I found this information on page __________.

Identify the 2 ways to match up, or correlate, exposed rock layers from two different places. Complete the graphic organizer.

SYNTHESESIT

As you pass through a highway cut, you notice distinct layers of rock. Can you be sure that the top layer is the youngest one? Explain.
Clues to Earth’s Past
Section 4 Absolute Ages of Rocks

Predict three things that might be discussed in Section 3 as you read the headings.

1. ______________________________________
   ______________________________________
   ______________________________________

2. ______________________________________
   ______________________________________
   ______________________________________

3. ______________________________________
   ______________________________________
   ______________________________________

Define isotopes to show its scientific meaning.

Define these key terms to show their scientific meaning.

radioactive decay

radiometric dating

uniformitarianism

Define ratio to show its scientific meaning.
Main Idea

Absolute Ages
Radioactive Decay

Organize information about radioactive decay as a tool to find a rock’s absolute age. Complete the Venn diagram below with at least six points of information.

Radioactive Decay

<table>
<thead>
<tr>
<th>Alpha decay</th>
<th>Both</th>
<th>Beta decay</th>
</tr>
</thead>
</table>

Create a bar chart to show four half-lives. Then draw a curve connecting the tops of the bars. Label each axis.
Section 4  Absolute Ages of Rocks (continued)

Main Idea

Radiometric Ages

I found this information on page __________.

Details

Analyze carbon-14 dating by completing the statements.

The half-life of carbon-14 is __________________________.

When carbon-14 decays, it becomes ______________________.

Carbon-14 radiometric dating is used for ____________________,
_____________________, and ______________________ samples up
to ________________ old. Scientists compare amounts of
carbon-14 in the ____________________ to the amount in a fossil
of an organism that lived long ago. While the organism was alive,
it took in and processed carbon-14 and ______________________.

The ___________________ of carbon-14 to carbon-12 tells the
approximate __________________ of the fossil.

Uniformitarianism

I found this information on page __________.

Summarize Hutton’s view of uniformitarianism and the modern
view of changes that affect Earth.

Hutton’s view: __________________________________________

________________________________________________________________

________________________________________________________________

Modern view: __________________________________________

________________________________________________________________

________________________________________________________________

SYNTHESIZE IT

Explain why the principle of uniformitarianism is critical to
what you have learned about determining the absolute age of rocks.
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>
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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

Identify three facts about fossils and rock layers that you found interesting.
Earth’s Place in 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>Earth’s Place in Space</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
<tr>
<td>• Observers on Earth always see the same side of the Moon.</td>
<td></td>
</tr>
<tr>
<td>• Most asteroids are about the same size as Earth.</td>
<td></td>
</tr>
<tr>
<td>• The solar system probably formed from a collapsing cloud of gas, ice, and dust.</td>
<td></td>
</tr>
</tbody>
</table>

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

Science Journal

Describe how our view of Earth has changed in the past 50 years.
Earth’s Place in Space
Section 1 Earth’s Motion and Seasons

Scan the illustrations in Section 1. Write three questions that come to mind about Earth’s motions. Look for answers to your questions as you read through the section.

1. 
2. 
3. 

Define equator. Then use the term in a sentence that shows its scientific meaning.

equator

Read the definitions below. Write the correct vocabulary term on the blank to the left of each definition.

imaginary line around which Earth spins; drawn from Earth’s north geographic pole to its south geographic pole

time when the Sun reaches its greatest distance north or south of the equator

curved path followed by Earth as it moves around the Sun

motion of Earth around the Sun in about 365 \( \frac{1}{4} \) days, or one year

twice-yearly time when the Sun is directly above Earth’s equator

spinning of Earth on its axis which causes day and night

Use a dictionary to define sphere to show its scientific meaning.
Section 1 Earth’s Motion and Seasons (continued)

**Main Idea**

**Earth’s Physical Data**
I found this information on page __________.

**Evidence**

**Cause**

Earth’s shape

**Model** Earth’s shape, and then write a caption below your diagram.

**Details**

*Summarize* key facts about Earth’s shape in the graphic organizer.

I found this information on page __________.

**Motions of Earth**
I found this information on page __________.

*Complete* the statements below to explain why people on Earth experience day and night.

Earth rotates once ________________ around an imaginary line called ________________. As Earth rotates, each location on Earth will face toward the Sun and have ________________ and then face away from the Sun and have ________________.
Section 1 Earth’s Motion and Seasons (continued)

Main Idea

Motions of Earth

I found this information on page _________.

Details

Summarize factors that cause seasons. Complete the outline.

I. Earth’s Orbit
A. __________________________________________
B. __________________________________________
   1. __________________________________________
   2. __________________________________________

II. Earth’s Tilt
A. __________________________________________
B. __________________________________________
   1. __________________________________________
   2. __________________________________________

Draw a sketch of Earth’s orbit around the Sun. Label the solstices and equinoxes. Include their approximate dates.

[Blank space for sketch]

SUMMARIZE IT

Using the information that you have learned, write a short summary explaining why seasons occur.

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________
Earth’s Place in Space

Section 2 Earth’s Moon

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.H.1.3.1, SC.H.1.3.4, SC.H.2.3.1

**Predict** three things that might be discussed in Section 2 after you have read its title and headings.

1. 

2. 

3. 

**Define** density to show its scientific meaning. Then give an example of one high-density material and one low-density material.

**New Vocabulary**

- **density**

**Use your book to define each vocabulary term.**

- **moon phase**

- **solar eclipse**

- **lunar eclipse**

**Academic Vocabulary**

- **cycle**

**Use the term cycle in a scientific sentence.**
Section 2 Earth’s Moon (continued)

Main Idea

The Moon’s Surface and Interior
I found this information on page __________.

Details

Complete the graphic organizer with information about the Moon’s surface features.

Moon’s Surface Features

- maria
- lunar highlands
- craters

Model the Moon’s interior. Label each of the main layers of the Moon.

Motions of the Moon
I found this information on page __________.

Analyze the reason that the same side of the Moon always faces Earth.

I found this information on page __________.
Main Idea

Motions of the Moon

Label each Moon phase on the diagram below. Shade the Moon at each position to show the dark side.

Contrast solar and lunar eclipses. Complete the table.

<table>
<thead>
<tr>
<th></th>
<th>Solar Eclipse</th>
<th>Lunar Eclipse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moon phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What happens</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Origin of the Moon

Summarize four hypotheses about how the Moon formed. Place a star next to the most widely accepted hypothesis.

1. 
2. 
3. 
4. 
Earth’s Place in Space
Section 3 Earth and the Solar System

Skim Section 3. Write three things you think you will learn about the solar system.

1. 
2. 
3. 

Review Vocabulary

Define atmosphere in a scientific sentence.

atmosphere

New Vocabulary

Use your book to define each vocabulary term.

solar system

astronomical unit

asteroid

nebula

Academic Vocabulary

Use a dictionary to define image as it is used in science.

image
Main Idea

Size of the Solar System
I found this information on page __________.

Details

Summarize key facts about the Sun and its role in the solar system.

The Sun contains ___________ of the matter in the solar system. It is a ___________ star that gives off ___________ amounts of light. The Sun is about ___________ km from Earth. This distance is also called 1 ___________, or ___________

Contrast the inner and outer planets. Complete the table.

<table>
<thead>
<tr>
<th>Location</th>
<th>Inner Planets</th>
<th>Outer Planets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Composition</th>
<th>Inner Planets</th>
<th>Outer Planets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inner Planets
I found this information on page __________.

Organize information about the inner planets. Complete the graphic organizer with at least three facts about each one.

Mercury
Venus
Earth
Mars

Inner Planets

Earth’s Place in Space 111
Main Idea

Outer Planets

I found this information on page __________.

Distinguish major characteristics of the outer planets. Complete the table.

<table>
<thead>
<tr>
<th>Composition</th>
<th>Moons/Rings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jupiter</td>
<td>63 moons; Io is volcanic; Europa may have liquid water</td>
</tr>
<tr>
<td>Saturn</td>
<td></td>
</tr>
<tr>
<td>Uranus</td>
<td>hydrogen, helium, and methane; methane gives bluish-green color</td>
</tr>
<tr>
<td>Neptune</td>
<td>hydrogen, helium, and methane; faster winds than on any other planet</td>
</tr>
<tr>
<td>Pluto</td>
<td></td>
</tr>
</tbody>
</table>

Other Objects in the Solar System

I found this information on page __________.

Summarize important facts about asteroids and comets.

Asteroids are ______________ objects. Comets are made of ______________. As a comet approaches the Sun, it forms a ______________ as solar winds blow small particles ______________.

Origin of the Solar System

I found this information on page __________.

Sequence the steps in the formation of the solar system.

1. ______________________________________

2. ______________________________________

3. ______________________________________
Make a Scale Model

Make a scale model of the solar system's planets.

Use the diameters in the table to make your model. Set one planet's scale diameter to calculate the others. Use math and ratios to figure out the size each planet should be on paper. For example, if Jupiter was to be 10 cm on your scale drawing,

\[
\frac{\text{Jupiter} \ 142,984 \ \text{km}}{\text{Mercury} \ 4,879 \ \text{km}} = \frac{10 \ \text{cm}}{x}
\]

\[x = \frac{(4,789 \times 10)}{142,984} = 0.34 \ \text{cm} \] Mercury would be 0.34 cm on the same drawing.

Label each planet in your model with one important fact about that planet.

<table>
<thead>
<tr>
<th>Planet</th>
<th>Diameter (km)</th>
<th>Scale diameter (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>4,879</td>
<td>0.34</td>
</tr>
<tr>
<td>Venus</td>
<td>12,104</td>
<td></td>
</tr>
<tr>
<td>Earth</td>
<td>12,756</td>
<td></td>
</tr>
<tr>
<td>Mars</td>
<td>6,794</td>
<td></td>
</tr>
<tr>
<td>Jupiter</td>
<td>142,984</td>
<td>10.0</td>
</tr>
<tr>
<td>Saturn</td>
<td>120,536</td>
<td></td>
</tr>
<tr>
<td>Uranus</td>
<td>51,118</td>
<td></td>
</tr>
<tr>
<td>Neptune</td>
<td>49,528</td>
<td></td>
</tr>
<tr>
<td>Pluto</td>
<td>2,390</td>
<td></td>
</tr>
</tbody>
</table>
Earth’s Place in Space  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>Earth’s Place in Space</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
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<tr>
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</tr>
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</table>

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☐ 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 solar system.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

114  Earth’s Place in Space
Cells

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 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.

Write three questions that you would ask a scientist researching cancer cells.

---

Before You Read

Sunshine State Standards—SC.F.1: The student describes patterns of structure and function in living things.
Also covers: SC.G.1, SC.H.2, SC.H.3

Cells

Science Journal

Write three questions that you would ask a scientist researching cancer cells.

---
Cells

Section 1 Cell Structure

Benchmarks—SC.F.1.3.2: The student knows that the structural basis of most organisms is the cell . . . .
Also covers: SC.F.1.3.4, SC.F.1.3.5, SC.F.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. Write two questions that come to mind.
1. ____________________________________________
2. ____________________________________________

Review Vocabulary
Write sentences using the Review Vocabulary and New Vocabulary words. Use two or more of the vocabulary words in each sentence.

photosynthesis

New Vocabulary

cell membrane

cytoplasm

cell wall

organelle

nucleus

chloroplast

mitochondrion

ribosome

endoplasmic reticulum

Golgi body

tissue

organ

Academic Vocabulary
Write sentences using function as a noun and as a verb.

function

Noun: ____________________________________________

Verb: ____________________________________________
Complete the following statement about a cell.

A cell is _____________________________________________.

Model a prokaryotic cell and a eukaryotic cell. Show the difference between the two types.

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell wall</td>
<td></td>
</tr>
<tr>
<td>Nucleus</td>
<td></td>
</tr>
<tr>
<td>Chloroplast</td>
<td></td>
</tr>
<tr>
<td>Mitochondria</td>
<td></td>
</tr>
<tr>
<td>Ribosomes</td>
<td></td>
</tr>
<tr>
<td>Endoplasmic reticulum</td>
<td></td>
</tr>
<tr>
<td>Golgi bodies</td>
<td></td>
</tr>
<tr>
<td>Lysosomes</td>
<td></td>
</tr>
</tbody>
</table>
**Main Idea**

**From Cell to Organism**

I found this information on page ________.

**Details**

Sequence the following terms from simplest (at the top) to most complex in the chart below. Define each one and provide an example.

<table>
<thead>
<tr>
<th>term</th>
<th>example</th>
</tr>
</thead>
<tbody>
<tr>
<td>tissue</td>
<td>organism</td>
</tr>
</tbody>
</table>

Term: _______  Example: _______
Definition: _______

Term: _______  Example: _______
Definition: _______

Term: _______  Example: _______
Definition: _______

Term: _______  Example: _______
Definition: _______

Term: _______  Example: _______
Definition: _______

**SYNTHESIZE IT**

Compare and contrast animal and plant cells.
Cells
Section 2 Viewing Cells

Benchmarks—SC.H.1.3.3: The student knows that science disciplines differ from one another in topic, techniques, and outcomes but that they share a common purpose, philosophy, and enterprise. Also covers: SC.H.1.3.1, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.6, SC.H.3.3.5

Predict three things that might be discussed in this section after reading its headings.

1. ____________________________________________________________
2. ____________________________________________________________
3. ____________________________________________________________

Define magnify in a sentence to show its scientific meaning.

magnify

__________________________________________________________________________

Find a sentence in Section 2 in which cell theory is used and write it here.

cell theory

__________________________________________________________________________
__________________________________________________________________________

Use a dictionary to define compound as an adjective.

compound

__________________________________________________________________________
__________________________________________________________________________

Write a sentence from Section 2 in which the word compound is used as an adjective.

__________________________________________________________________________
__________________________________________________________________________

__________________________________________________________________________
Summarize information to describe van Leeuwenhoek’s microscope.

Evaluate the total magnification of a microscope with a 10X eyepiece lens and a 43X objective lens. Write the equation for finding total magnification. Then use it to show your calculation.

\[
\text{total magnification} = \text{objective magnification} \times \text{eyepiece magnification}
\]

\[
\text{total magnification} = 43 \times 10 = 430
\]

Compare compound microscopes with electron microscopes by completing the Venn diagram with at least seven facts.
Main Idea

Cell Theory
I found this information on page ___________.

Details

Summarize discoveries made by scientists that led to the cell theory.

Robert Hooke

Matthias Schleiden

Theodor Schwann

Rudolf Virchow

Identify the 3 main principles of the cell theory.

1. _______________

2. _______________

3. _______________

CONNECT IT

Describe how the development of the cell theory shows that scientific beliefs can change over time. Use specific examples.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Cells
Section 3 Viruses

Scan Section 3 of this chapter. Write three questions based on headings in the section. Answer the questions as you read.

1. 
2. 
3. 

Define disease to show its scientific meaning.

disease

Use your book to define each new vocabulary term.

virus

host cell

Use a dictionary to define apparent.

apparent

Explain what the following sentence means.

The virus is still in your body’s cells, but it is hiding and doing no apparent harm.
Section 3 Viruses (continued)

Main Idea

What are viruses?
I found this information on page .

How do viruses multiply?
I found this information on page .

Details

Organize information about viruses by completing the outline.
Viruses
I. Definition: ________________________________

II. Description:
A. Size: ________________________________
B. Shapes: ________________________________
III. Diseases caused by viruses
A. ____________________ C. ____________________
B. ____________________ D. ____________________

Summarize what a virus needs to reproduce.

Distinguish between an active virus and a latent virus.
A(n) _________________ enters a host cell, immediately causes the cell to make new viruses, and destroys the cell.
A(n) _________________ enters a host cell, but does not immediately make new viruses or destroy the cell.

Sequence the events when an active virus enters a host cell.
Section 3 Viruses (continued)

Main Idea

**How do viruses affect organisms?**
*I found this information on page _________.*

Details

**Define** bacteriophage and explain what it does to a bacterium.

**Fighting Viruses**
*I found this information on page _________.*

Sequence *the steps by which interferons work.*

**Research with Viruses**
*I found this information on page _________.*

Summarize *how scientists use viruses in gene therapy.*

CONNECT IT

Describe why it is not a good idea to take antibiotics for a cold.

---

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Tie It Together

A scientist is researching an unknown disease. After examining the disease-causing agent with a compound microscope and testing it in various ways, she has decided that the disease should be treated with an antibiotic drug to disrupt its membrane and prevent it from reproducing. Describe what is causing the disease and how you know.
Cells  Chapter Wrap-Up

Review the ideas you listed 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>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 you have learned about cells.

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

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Classifying Plants

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>Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• In tropical rain forests, there are more than 260,000 known plant species and probably more to be identified.</td>
</tr>
<tr>
<td></td>
<td>• Land plants’ ancestors may have been green algae that lived in the sea.</td>
</tr>
<tr>
<td></td>
<td>• Ferns and mosses produce spores rather than seeds.</td>
</tr>
<tr>
<td></td>
<td>• Paper and clothing are made from seed plants.</td>
</tr>
</tbody>
</table>

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

Science Journal

Write three characteristics that you think all plants have in common.
Skim the headings in Section 1. Then predict three facts you will learn from reading the section.

1. 
2. 
3. 

Define the word species to show its scientific meaning.

species 

Use your book to define the following key terms.

cuticle 

cellulose 

vascular plant 

nonvascular plant 

Use a dictionary to define adapt.

adapt
Section 1 An Overview of Plants (continued)

Main Idea

What is a plant?
I found this information on page __________.

Details

Summarize how plants make food by completing the concept map below. Use these terms: photosynthesis, chlorophyll, chloroplasts.

Origin and Evolution of Plants
I found this information on page __________.

Sequence the events in the table below. Write the oldest event at the bottom of the table and the youngest event at the top of the table.

Events
• First cone-bearing plants
• First flowering plants
• First green algae
• First land plants

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Section 1 An Overview of Plants (continued)

Main Idea

Life on Land
I found this information on page __________.

Adaptations to Land
I found this information on page __________.

Classification of Plants
I found this information on page __________.

Details

Summarize how land plants made life possible for land animals.

Identify the four structural adaptations and their functions that make it possible for plants to live on land.

<table>
<thead>
<tr>
<th>Plant Adaptations to Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
</tbody>
</table>

Complete the concept map below about plant classification.

CONNECT IT

Suppose that you are working at a greenhouse. While at work, a child asks you, “What’s a plant?” Write a short answer to this question.
Classifying Plants
Section 2 Seedless Plants

Skim Section 2 of your book. Then write three questions that you have about plants. Try to answer your questions as you read.

1. 
2. 
3. 

Define spore to show its scientific meaning. Write a sentence that reflects its scientific meaning.

spore

Use your book to define the following key terms. Then use each word in a sentence that reflects its scientific meaning.

rhizoid

pioneer species

Use a dictionary to define widespread. Write a sentence that shows its scientific meaning.

widespread
Main Idea

**Seedless Nonvascular Plants**

I found this information on page ___________.

Details

**Organize** the characteristics of seedless nonvascular plants by completing the chart below.

<table>
<thead>
<tr>
<th>Characteristics of Seedless Nonvascular Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
<tr>
<td>6.</td>
</tr>
<tr>
<td>7.</td>
</tr>
<tr>
<td>8.</td>
</tr>
</tbody>
</table>

**Complete** the concept map to identify examples and characteristics of seedless nonvascular plants. One example has been listed for you.

- **Mosses**
  - spores in caps on stalks

- **Liverworts**
  - less than 2.5 cm in diameter
Section 2 Seedless Plants (continued)

**Main Idea**

**Seedless Vascular Plants**

*Importance of Seedless Plants*

I found this information on page __________.

**Details**

Compare and contrast seedless vascular plants with seedless nonvascular plants in the Venn diagram below.

<table>
<thead>
<tr>
<th>Seedless vascular plants</th>
<th>Seedless nonvascular plants</th>
<th>Both</th>
</tr>
</thead>
</table>

Summarize the importance of seedless plants in the table below.

<table>
<thead>
<tr>
<th>Importance of Seedless Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
<tr>
<td>6.</td>
</tr>
<tr>
<td>7.</td>
</tr>
</tbody>
</table>

**CONNECT IT**

Suppose you are a naturalist working in a forest area that has recently burned in a forest fire. Summarize what you would tell visitors about seedless plants and how important they are to the forest’s recovery.
Classifying Plants
Section 3 Seed Plants

Scan Section 3 of your book. Write three questions that come to mind as you read the headings and examine the illustrations.

1. __________________________
2. __________________________
3. __________________________

Define seed. Then use this word in a sentence that reflects its scientific meaning.

seed

Read the definitions below. Write the correct key term on the blank in the left column. Use your book for help.

- a vascular plant that produces seeds that are not protected by fruit
- a vascular plant that flowers and produces fruit with one or more seeds
- a plant with one cotyledon inside its seeds
- a plant with two cotyledons inside its seeds

Define source. Use your book or a dictionary for help. Then use this word in a sentence that reflects its scientific meaning.

source
Section 3  Seed Plants (continued)

Main Idea

Characteristics of Seed Plants

Create the cross-section of a leaf in the space below. Label and describe the purpose of six important features.

I found this information on page ________.

Organize the characteristics of seed plants by completing the chart below.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves</td>
<td></td>
</tr>
<tr>
<td>Stems</td>
<td></td>
</tr>
<tr>
<td>Roots</td>
<td></td>
</tr>
<tr>
<td>Vascular tissue</td>
<td></td>
</tr>
</tbody>
</table>

I found this information on page ________.
**Gymnosperms**

I found this information on page ________.

**Angiosperms**

I found this information on page ________.

---

**Main Idea**

**Gymnosperms**

I found this information on page ________.

**Angiosperms**

I found this information on page ________.

**Importance of Seed Plants**

I found this information on page ________.

---

**Details**

**Gymnosperms**

Complete the chart below about gymnosperms by writing about the characteristics listed.

<table>
<thead>
<tr>
<th>Divisions</th>
<th>Seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flowers</th>
<th>Leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Angiosperms**

Complete the chart below about angiosperms by writing about the characteristics listed.

<table>
<thead>
<tr>
<th>Division</th>
<th>Seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flowers</th>
<th>Fruits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Skim** your book for two uses each of gymnosperms and angiosperms.

**Gymnosperms:**

1. ____________________________________________

2. ____________________________________________

**Angiosperms:**

1. ____________________________________________

2. ____________________________________________
Tie It Together

In the space below, draw a sketch of a tree. Label the tree’s roots, trunk, and leaves. Next to each label, write the important functions that each of these structures performs. Beneath your sketch, explain why trees are an important part of the environment.
Classifying Plants  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>Plants</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In tropical rain forests, there are more than 260,000 known plant species and probably more to be identified.</td>
<td></td>
</tr>
<tr>
<td>• Land plants’ ancestors may have been green algae that lived in the sea.</td>
<td></td>
</tr>
<tr>
<td>• Ferns and mosses produce spores rather than seeds.</td>
<td></td>
</tr>
<tr>
<td>• Paper and clothing are made from seed plants.</td>
<td></td>
</tr>
</tbody>
</table>

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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 plants.

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

Classifying Plants  138
Plant Processes

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>Plant Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Plants make their own food.</td>
<td></td>
</tr>
<tr>
<td>• Plants break down food to release energy.</td>
<td></td>
</tr>
<tr>
<td>• Plant stems grow away from light.</td>
<td></td>
</tr>
<tr>
<td>• Plants have hormones that control changes in their growth.</td>
<td></td>
</tr>
</tbody>
</table>

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

Science Journal

Describe what would happen to life on Earth if all the green plants disappeared.
Scan the illustrations in Section 1. Write three questions that you have about plants. Try to answer your questions as you read.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Use your book to define diffusion. Then create a sentence to illustrate its scientific meaning.

diffusion

Use your book to define the following terms.

stomata

chlorophyll

photosynthesis

cellular respiration

Use a dictionary to define release.

release
Main Idea

Taking In Raw Materials

Organize what you know about the different layers of a plant’s leaves by completing the table below.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidermis</td>
<td></td>
</tr>
<tr>
<td>Palisade layer</td>
<td></td>
</tr>
<tr>
<td>Spongy layer</td>
<td></td>
</tr>
</tbody>
</table>

Summarize why stomata are important structures in a plant leaf.

The Food-Making Process

Complete the equation for photosynthesis. Identify:

- the product that is stored as a food source
- the product that is released mostly as waste
- the product made during light-dependent reactions
- the product made during light-independent reactions

\[ 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{light energy} \rightarrow \text{Food source:} \quad \text{Waste product:} \]

<table>
<thead>
<tr>
<th>carbon dioxide</th>
<th>water</th>
<th>light energy</th>
<th>Food source:</th>
<th>Waste product:</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ \quad \text{made during} \quad \text{made during} ]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Define aerobic respiration.

Complete the equation for aerobic respiration.

$$C_6H_{12}O_6 + 6O_2 \rightarrow \text{______} + \text{______} + \text{______}$$

carbon dioxide  water

Compare the processes of photosynthesis and aerobic respiration by completing the table.

<table>
<thead>
<tr>
<th></th>
<th>Photosynthesis</th>
<th>Aerobic Respiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell structure in which process occurs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Create a concept map or other diagram to summarize what you learned in this section about plant structure and function.
Plant Processes
Section 2 Plant Responses

Benchmarks—SC.F.1.3.7: The student knows that behavior is as response to the environment and influences growth, development, maintenance, and reproduction. Also covers: SC.H.1.3.5, SC.H.2.3.1, SC.H.1.3.7

Scan Section 2. Predict three things that you will learn.
1. 
2. 
3. 

Define behavior to reflect its scientific meaning.
behavior

Write the correct vocabulary term next to each definition. Use your book to help you.

response of a plant to external stimuli, movement caused by change in growth

type of plant hormone that causes plant stems and leaves to exhibit positive responses to light

plant’s response to the number of hours of daylight and darkness it receives

plant that generally requires short nights—less than 12 hours of darkness—to begin the flowering process

plant that generally requires long nights—12 or more hours of darkness—to begin the flowering process

plant that does not require a specific photoperiod and can begin the flowering process over a range of night lengths

Use a dictionary to define respond.
respond
Distinguish the types of stimuli as internal or external.

1. a stimulus that comes from outside the body
2. a stimulus that comes from inside the body

Complete the table below. Identify the stimulus for each described response.

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plant stem grows faster on one side. Stem bends and twists around object.</td>
</tr>
<tr>
<td></td>
<td>Plant bends toward light. Leaves turn and absorb more light.</td>
</tr>
<tr>
<td></td>
<td>Roots grow downward. Stems grow upward.</td>
</tr>
</tbody>
</table>

Compare the effects of different hormones that affect plants.

Plant Hormones

- **Ethylene**: helps stems to grow toward light
- **Gibberellins**: causes seeds sprouting and buds from developing in winter, and tomatoes opening on hot days
- **Cytokininns**: stimulate stems to grow toward light

Tropisms

I found this information on page ____________.
Section 2 Plant Responses (continued)

Main Idea

Plant Hormones
I found this information on page _________.

Details

Create a diagram to illustrate how auxin causes a stem to grow in response to sunlight. Write a short caption to describe where auxin is concentrated in the stem.

Photoperiods
I found this information on page _________.

Complete the table below to show your understanding of the effects of photoperiodism on different types of plants.

<table>
<thead>
<tr>
<th>Type of Plant</th>
<th>Hours of Darkness Needed to Flower</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>need less than 12 hours</td>
<td>spinach, lettuce, and beets</td>
</tr>
<tr>
<td></td>
<td>need 12 or more hours</td>
<td>poinsettias, strawberries, and ragweed</td>
</tr>
<tr>
<td></td>
<td>do not need a specific amount of light</td>
<td>dandelions and roses</td>
</tr>
</tbody>
</table>

Connect It

Explain plant responses you might see in plants that are growing indoors on a windowsill.
Plant Processes  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>Plant Processes</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Plants make their own food.</td>
<td></td>
</tr>
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<td>• Plants break down food to release energy.</td>
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<tr>
<td>• Plant stems grow away from light.</td>
<td></td>
</tr>
<tr>
<td>• Plants have hormones that control changes in their growth.</td>
<td></td>
</tr>
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</table>

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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 you have learned about plant processes.
Classifying Animals

Sunshine State Standards—SC.H.2: The student understands that most natural events occur in comprehensible, consistent patterns.

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>Classifying Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Most animals have a backbone.</td>
<td></td>
</tr>
<tr>
<td>• Animals are made up of many cells and have many different types of cells.</td>
<td></td>
</tr>
<tr>
<td>• Animals can make their own food.</td>
<td></td>
</tr>
<tr>
<td>• All animals can digest their food.</td>
<td></td>
</tr>
<tr>
<td>• All animals can move from place to place.</td>
<td></td>
</tr>
</tbody>
</table>

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

Describe similarities and differences between you and a coral.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Classifying Animals
Section 1 What is an animal?

Preview Section 1 by reading the headings. Write three questions you have about the content of the section.

1. _____________________________________________
2. _____________________________________________
3. _____________________________________________

Define organelle to show its scientific meaning.

organelle

Define the following key terms. Below each definition, copy one sentence from Section 1 of your book that uses the word. Do not copy the sentence that gives the definition.

vertebrate

invertebrate

Use a dictionary to define indicate.

indicate
**Main Idea**

**Animal Characteristics**
*I found this information on page ____________.

**Details**

Complete the following chart by writing a statement about each characteristic of animals.

<table>
<thead>
<tr>
<th>Animals</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic</td>
<td></td>
</tr>
<tr>
<td>Cells</td>
<td></td>
</tr>
<tr>
<td>Nucleus and organelles</td>
<td></td>
</tr>
<tr>
<td>Obtaining energy</td>
<td></td>
</tr>
<tr>
<td>Digesting food</td>
<td></td>
</tr>
<tr>
<td>Movement</td>
<td></td>
</tr>
</tbody>
</table>

**Symmetry**
*I found this information on page ____________.

Compare forms of animal symmetry by drawing an example for each of the three types of symmetry below.

<table>
<thead>
<tr>
<th>Asymmetry</th>
<th>Bilateral Symmetry</th>
<th>Radial Symmetry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 1 What is an animal? (continued)

Main Idea

Animal Classification

Classify the types of animals. Complete the graphic organizer.

Details

I found this information on page _______.

CONNECT IT

Design an imaginary animal species. Keep in mind the five common characteristics of animals. Give your animal species a name. Draw it and label its parts.

My animal species: 

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Scan the section headings in Section 2 of your book. Write three questions that come to your mind.

1. ________________________________
2. ________________________________
3. ________________________________

Define species to show its scientific meaning.

species

Use your book to define the following terms.

open circulatory system

closed circulatory system

appendage

exoskeleton

metamorphosis

Use your book or a dictionary to define adult.

adult
Main Idea

**Sponges**
I found this information on page __________.

**Cnidarians**
I found this information on page __________.

**Flatworms and Roundworms**
I found this information on page __________.

**Mollusks**
I found this information on page __________.

Details

**Summarize** key facts about sponges. Fill in the missing information.

- Sponges have __________ layers of cells. Flagella move __________, carrying __________.
- Sponges use __________ and __________ for protection. Sponges can reproduce __________ or __________ through __________.

**Organize** information about cnidarians. Complete the graphic organizer.

- Cnidarians
  - Body structure
  - Reproduction

**Compare and contrast** flatworms and roundworms. Complete the table.

<table>
<thead>
<tr>
<th></th>
<th>Flatworms</th>
<th>Roundworms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body shape</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body layers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digestive system openings</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Distinguish** key features of mollusks.

1. Body structures: ____________________________________________________________________
   ____________________________________________________________________

2. Body systems: ____________________________________________________________________
   ____________________________________________________________________
Section 2 Invertebrate Animals (continued)

Main Idea

Segmented Worms

I found this information on page ____________.

Arthropods

I found this information on page ____________.

Echinoderms

I found this information on page ____________.

Details

Summarize four characteristics of segmented worms.

1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________

Organize information about arthropods. Complete the graphic organizer.

Contrast complete and incomplete metamorphosis.

Complete metamorphosis includes ____________ stages:

Incomplete metamorphosis includes ____________ stages:

Identify three body systems found in echinoderms.

CONNECT IT

Evaluate how the ability to move from place to place would give an invertebrate an advantage in getting food and reproducing.

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________
Classifying Animals

Section 3 Vertebrate Animals

Scan Section 3 of your book. Then write two facts that you learned about vertebrate animals.

1. 
2. 

Define life cycle to show its scientific meaning.

life cycle

Match each vocabulary term to its definition.

animal that has a notochord, a nerve cord, and pharyngeal pouches at some time during its development

warm-blooded animal

cold-blooded animal

egg with a yolk and protective shell

animal that eats meat

animal that eats plants

animal that eats plants and animals

Use a dictionary to define hierarchy.

hierarchy
Section 3 Vertebrate Animals (continued)

Main Idea

**What is a chordate?**

I found this information on page ________.

**Fish**

I found this information on page ________.

**Amphibians**

I found this information on page ________.

Details

**Distinguish** the three characteristics all chordates share.

1. __________
2. __________
3. __________

**Compare and contrast** ectotherms and endotherms.

Ectotherms’ body temperature _____________.

Endotherms’ body temperature _____________.

**Complete** the table to summarize important information about fish.

<table>
<thead>
<tr>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
</tr>
<tr>
<td>Motion</td>
</tr>
<tr>
<td>Skin</td>
</tr>
</tbody>
</table>

**Organize** information about amphibian characteristics and development. **Complete the concept map.**
Section 3 Vertebrate Animals (continued)

Main Idea

Reptiles
I found this information on page __________.

Summarize four important reptile adaptations.

<table>
<thead>
<tr>
<th>Adaptation</th>
<th>Purpose</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>
</tbody>
</table>

Birds
I found this information on page __________.

Distinguish six characteristics of birds.

1. ________________  4. ________________
2. ________________  5. ________________
3. ________________  6. ________________

Mammals
I found this information on page __________.

Organize information about mammal structures and body systems.

SYNTHESIZE IT

Why is being an endotherm useful for mammals and birds?
Tie It Together

Make a Field Guide

Choose three wild animals with which you are familiar. At least one of your animals should be an invertebrate. Make a field guide describing each animal. Include information about the animal’s body structures and body systems, where it lives, what it eats, and how it is adapted to its environment. Include illustrations if possible. Use the space below to plan your guide.

Animal 1: _____________________________________________________________

Information: __________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

Animal 2: _____________________________________________________________

Information: __________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

Animal 3: _____________________________________________________________

Information: __________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________
Classifying Animals  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>Classifying Animals</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Most animals have a backbone.</td>
<td></td>
</tr>
<tr>
<td>• Animals are made up of many cells and have many different types of cells.</td>
<td></td>
</tr>
<tr>
<td>• Animals can make their own food.</td>
<td></td>
</tr>
<tr>
<td>• All animals can digest their food.</td>
<td></td>
</tr>
<tr>
<td>• All animals can move from place to place.</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 animals.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
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>Animal Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A bird must learn how to build a nest.</td>
<td></td>
</tr>
<tr>
<td>• A gosling follows the first moving object it sees after hatching.</td>
<td></td>
</tr>
<tr>
<td>• Some animals may show submissive behavior to prevent another animal from attacking.</td>
<td></td>
</tr>
<tr>
<td>• Many animals move to new locations when the seasons change.</td>
<td></td>
</tr>
</tbody>
</table>

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

What behaviors might an animal use to signal that a territory is occupied?
Skim the What You’ll Learn statements in Section 1. Predict three topics that you expect will be discussed in this section.

1. ________________________________
2. ________________________________
3. ________________________________

Define salivate to show its scientific meaning.

Read the definitions below. Write the correct vocabulary terms on the blanks in the left column.

way an organism interacts with other organisms and its environment

behavior that an organism is born with and that does not need to be learned

animal’s formation of a social attachment to another organism during a specific period following birth or hatching

modifying behavior so that a response to one stimulus becomes associated with a different stimulus

form of reasoning that allows animals to use past experiences to solve new problems

Use a dictionary to define internal to show its scientific meaning.
Section 1 Types of Behavior (continued)

**Main Idea**

**Behavior**

*I found this information on page ________.*

**Details**

**Complete** the flow charts with examples of internal and external stimuli and responses.

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>External</td>
<td></td>
</tr>
<tr>
<td>Internal</td>
<td></td>
</tr>
</tbody>
</table>

**Innate Behavior**

*I found this information on page ________.*

**Identify** two types of innate behavior. *Define them and provide at least two examples of each.*

<table>
<thead>
<tr>
<th>Innate Behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Behavior</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

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Learned Behavior

I found this information on page _________.

Analyze *the importance of* learned behavior for animals.

Learned behaviors help animals __________________________
________________________. Animals that can learn are
________________________ than those that cannot. Learned behavior is most
commonly found in animals with ____________ life spans.

Summarize *four ways behaviors are learned.*

<table>
<thead>
<tr>
<th>Behavior Name:</th>
<th>Behavior Description:</th>
</tr>
</thead>
</table>
| Example:       | An animal forms a social
                attachment within a short
time after birth or hatching. |
|                |                       |
|                |                       |
|                |                       |
|                |                       |
Animal Behavior
Section 2 Behavioral Interactions

**Scan** Section 2 by reading the headings and examining the illustrations. Then write three questions that you hope to answer as you read the section. Look for the answers as you read.

1. ..............................................................
2. ..............................................................
3. ..............................................................

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

nectar

**Use your book to define the following terms. Then use each term in a sentence.**

**pheromone**

**cyclic behavior**

**migration**

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

dominate
Section 2 Behavioral Interactions (continued)

**Main Idea**

**Instinctive Behavior Patterns**
*I found this information on page ________.*

**Social Behavior**
*I found this information on page ________.*

**Territorial Behavior**
*I found this information on page ________.*

---

**Details**

**Identify** two instinctive ritual animal behaviors.

1. ____________________
2. ____________________

**Identify** three advantages for animals living in groups.

**Summarize** the key features of a society in the paragraph below.

A society is _____________________________. Members of societies have specific roles. In societies that are organized by dominance, _____________________________.

**Organize** information about territorial behavior. **Identify how animals mark their territories and why and how they defend them.**

---

---

---

---
Main Idea

Communication
I found this information on page _________.

Cyclic Behavior
I found this information on page _________.

Details

Classify types of animal communication. Complete the table below.

<table>
<thead>
<tr>
<th>Type of Communication</th>
<th>What It Is</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical communication</td>
<td>behaviors that allow males and females of a species to recognize and mate with each other</td>
<td>firefly giving off a flash of light to attract a mate</td>
</tr>
<tr>
<td>Animals make sounds to communicate with other animals of the same species.</td>
<td>firefly giving off a flash of light to attract a mate</td>
<td></td>
</tr>
</tbody>
</table>

Define each of the following cyclic behaviors.

circadian rhythm: ________________________________
______________________________
______________________________

hibernation: ________________________________
______________________________
______________________________

estivation: ________________________________
______________________________
______________________________
Animal Behavior 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>Animal Behavior</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>A bird must learn how to build a nest.</td>
<td></td>
</tr>
<tr>
<td>A gosling follows the first moving object it sees after hatching.</td>
<td></td>
</tr>
<tr>
<td>Some animals may show submissive behavior to prevent another animal from attacking.</td>
<td></td>
</tr>
<tr>
<td>Many animals move to new locations when the seasons change.</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.
- [ ] 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 animal behavior.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
The Nonliving Environment

Before You Read

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

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

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

Science Journal

List all the nonliving things that you might see at a beach, in order of importance. Explain your reasoning for the order you chose.

________________________________________
________________________________________
________________________________________
________________________________________
________________________________________
________________________________________
________________________________________
________________________________________
The Nonliving Environment

Section 1 Abiotic Factors

Benchmarks—SC.G.1.3.4: The student knows that the interactions of organisms with each other and with the non-living parts of their environments, result in the flow of energy and the cycling of matter throughout the system. Also covers: SC.B.1.3.1, SC.D.1.3.4, SC.G.2.3.2, SC.H.1.3.4, SC.H.2.3.1

Preview the What You’ll Learn statements for Section 1. Rewrite each statement into a question.

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

Define environment to show its scientific meaning.

environment

Define the following terms to show their scientific meaning.

biotic

abiotic

atmosphere

soil

climate

Use a dictionary to define external.

external
Section 1 Abiotic Factors (continued)

Main Idea

Environmental Factors

I found this information on page ___________.

Classify the 7 environmental factors as biotic or abiotic.

<table>
<thead>
<tr>
<th>Factors needed for life</th>
<th>Biotic</th>
<th>Abiotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Air

I found this information on page ___________.

Compare and contrast how gases are used during photosynthesis and respiration.

<table>
<thead>
<tr>
<th>Photosynthesis</th>
<th>Respiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas used</td>
<td></td>
</tr>
<tr>
<td>Gas released</td>
<td></td>
</tr>
<tr>
<td>Purpose</td>
<td></td>
</tr>
</tbody>
</table>

Water and Soil

I found this information on page ___________.

Summarize how organisms use water and soil. Complete the paragraph.

Most organisms are ____________ percent water. Processes such as ____________, ____________, and ____________ need water to occur. Environments with plenty of water usually have ______________ of organisms than environments with little water. Organisms also need ____________.

__________, ____________, ____________, and ____________ all live in soil. The type of soil influences the types of ____________ that can grow in a region.
Describe the climate of your community. Identify its latitude, elevation, temperature, and precipitation characteristics.

**Main Idea**

**Sunlight**

I found this information on page ___________.

**Temperature**

I found this information on page ___________.

**Climate**

I found this information on page ___________.

**Details**

Label the diagram to show the flow of energy through living things. Label consumers, producers, and sunlight.

![Diagram]

Analyze how latitude and elevation affect temperature.

Latitude: ____________________________

Elevation: ____________________________

Sequence steps to explain the rain shadow effect.

1. Moist air is forced upward by a mountain.

2. ____________________________

3. ____________________________

4. ____________________________

**CONNECT IT**

Describe the climate of your community. Identify its latitude, elevation, temperature, and precipitation characteristics.

___________________________

___________________________

___________________________

___________________________

General Education Science
The Nonliving Environment
Section 2 Cycles in Nature

Benchmarks—SC.G.1.3.4: The student knows that the interactions of organisms with each other and with the non-living parts of their environments result in the flow of energy and the cycling of matter throughout the system. Also covers: SC.D.1.3.3, SC.D.1.3.4, SC.G.1.3.5, SC.G.2.3.3, SC.G.2.3.4, SC.H.2.3.1

Skim the headings and illustrations in Section 2. List three kinds of cycles you will learn about in the section.

1. __________________________
2. __________________________
3. __________________________

Define biosphere to show its scientific meaning.

biosphere

Read the definitions below. Write the correct vocabulary term on the blank to the left.

model describing how carbon molecules move between the living and the nonliving world

process that takes place when a gas changes to a liquid

process in which some types of bacteria in the soil change nitrogen gas into a form of nitrogen that plants can use

process that takes place when a liquid changes to a gas

model describing how water moves from Earth’s surface to the atmosphere and back again through evaporation, condensation, and precipitation

model describing how nitrogen moves from the atmosphere to the soil, to living organisms, and then back to the atmosphere

Define process as it is used in the definitions above. Use a dictionary to help you.

process
Summarize the importance of cycles to life on Earth.

Model the water cycle in a drawing.
- Label phases of the cycle including evaporation, transpiration, condensation, and precipitation.
- Label the sources and forms the water takes.
- Use arrows to show the direction in which water is moving at each part of the cycle.

Identify the 3 ways that nitrogen is made available to plants.

Plants use nitrogen compounds to build cells.
Describe one way that farmers may take away soil nitrogen and two ways that farmers can increase the amount of nitrogen in soil.

Harvesting: 

Fertilizer: 

Nitrogen-fixing crops: 

Model the carbon cycle. Identify the role of each item shown in the cycle. Draw arrows showing the flow of carbon through the system.

Air

Producers (Plants and algae)

Consumers

Burning wood and fossil fuels
The Nonliving Environment

Section 3 Energy Flow

Benchmarks—SC.G.1.3.4: knows that the interactions of organisms with each other and with the non-living parts of their environments result in the flow of energy and the cycling of matter throughout the system. Also covers: SC.B.1.3.1, SC.B.1.3.4, SC.D.1.3.3, SC.G.1.3.5, SC.H.1.3.1, SC.H.1.3.2, SC.H.1.3.4, SC.H.1.3.6, SC.H.1.3.7, SC.H.2.3.1, SC.H.3.3.5

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 energy to show its scientific meaning.

energy

Define the following terms to show their scientific meaning.

chemosynthesis

food web

energy pyramid

Use a dictionary to locate the scientific meaning of convert. Write a sentence using that scientific meaning.

convert

The Nonliving Environment

174
Main Idea

Converting Energy

I found this information on page _______.

Details

Compare and contrast photosynthesis and chemosynthesis. Complete the Venn diagram with at least seven points of information from your book.

Create an example of a food chain.
- Include and label a producer, a herbivore, and a carnivore or omnivore that eats the herbivore.
- Use arrows to show the transfer of energy.

The Nonliving Environment 175
Synthesize information about food webs. Draw arrows to show the energy transfers in the food web shown.

- eagle
- weasel
- mouse
- plants
- rattlesnake
- squirrel

Sequence the levels of an energy pyramid.
- Label each level as containing carnivores, herbivores, or producers.
- Label each level with the percentage of total energy that is available at that level.

Describe the flow of matter and energy in a food chain made up of grasses, mice, and hawks, and what might happen to the food chain if a fire destroyed much of the grass.
Tie It Together

A developer wants to build homes on land near your community and wants to know how the environment will affect the people who live in the homes, and how the homes will affect the environment.

Prepare an environmental study for the developer, including information about
• the abiotic factors in the area that could affect the people in the home
• how the new homes might affect natural cycles and food webs in the area

Use paragraphs and/or pictures to help you explain your points.
The Nonliving Environment

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 What I know</th>
<th>W What I want to find out</th>
<th>L What I learned</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>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
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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 you have learned.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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>Conserving Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Biodiversity tends to decrease as you move toward the equator.</td>
<td></td>
</tr>
<tr>
<td>• The loss of habitat is a major reason why many species become endangered.</td>
<td></td>
</tr>
<tr>
<td>• Habitats that have been harmed by human activities cannot be restored.</td>
<td></td>
</tr>
<tr>
<td>• Keeping some endangered animals in captivity can help preserve biodiversity.</td>
<td></td>
</tr>
</tbody>
</table>

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

Science Journal

List a species that you believe is important for maintaining biodiversity, and explain why it is important.
Conserving Life
Section 1 Biodiversity

Scan the headings in Section 1 of your book. Write three facts you discovered about biodiversity as you scanned this section.

1. __________________________
2. __________________________
3. __________________________

Review Vocabulary

Define mammal to show its scientific meaning.

mammal

New Vocabulary

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

biodiversity

native species

ozone depletion

Academic Vocabulary

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

stable
Identify the choice in each pair that has a higher level of biodiversity by circling it.

<table>
<thead>
<tr>
<th>Locations with Higher Levels of Biodiversity</th>
</tr>
</thead>
<tbody>
<tr>
<td>wheat field</td>
</tr>
<tr>
<td>coral reef</td>
</tr>
<tr>
<td>warmer climate</td>
</tr>
</tbody>
</table>

Summarize ways that biodiversity is good for human wants and needs. List ways that biodiversity is good for the health of the ecosystems on Earth. Give an example or explanation for each point.

What Biodiversity Provides for Humans:
- medicines: many were originally from wild plants

How Biodiversity Helps Ecosystems:
- breakdown of pollutants by organisms in soil
Section 1  Biodiversity (continued)

**Main Idea**

**What changes biodiversity?**

I found this information on page ________.

I found this information on page ________.

**Details**

**Identify** two important causes of extinction.

1. __________________________________________

2. __________________________________________

**Sequence** events that may have caused the extinction of dinosaurs.

- Great amounts of dust were thrown into the air.
- Dinosaurs became extinct.

**Pollution**

I found this information on page ________.

**Organize** the types of pollution and examples of pollutants.

<table>
<thead>
<tr>
<th>Type of Pollution</th>
<th>Pollutants and/or Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>pesticides, chemicals, oil/factories, ships, runoff from lawns and farms</td>
</tr>
</tbody>
</table>

**CONNECT IT**

Describe the impact of clearing a forest area to build houses.
Conserving Life
Section 2 Conservation Biology

Benchmarks—SC.D.2.3.1: The student understands that the quality of life is relevant to personal experience.
Also covers: SC.D.2.3.2, SC.G.2.3.3, SC.G.2.3.4, SC.H.1.3.3, SC.H.1.3.4, SC.H.1.3.6, SC.H.1.3.7, SC.H.3.3.6

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

1. ____________________________
2. ____________________________
3. ____________________________

Define habitat to show its scientific meaning.

habitat

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

__________________________
study of methods for protecting Earth’s biodiversity

__________________________
process of bringing a damaged habitat back to a healthy condition

__________________________
conservation strategy that returns organisms to an area where the species once lived

__________________________
population of organisms that is cared for by humans

Use a dictionary to define strategy. Write a sentence to show its scientific meaning.

__________________________

__________________________

__________________________
Define the career of a conservation biologist.

Analyze the challenge that conservation biologists face when developing their strategies.

Create a graphic organizer to identify the 2 goals of most conservation plans.
## Main Idea

**Conservation Biology at Work**

_I found this information on page __________._

## Details

_Model flash cards on ways to prevent the extinction of species. Put the title of each at the top of the card. Then write information and examples for each conservation biology method._

<table>
<thead>
<tr>
<th>Method</th>
<th>Information and Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed Banks</td>
<td></td>
</tr>
<tr>
<td>Convention on International Trade in Endangered Species, CITES</td>
<td></td>
</tr>
<tr>
<td>Habitat Preservation</td>
<td></td>
</tr>
<tr>
<td>Wildlife Management</td>
<td></td>
</tr>
<tr>
<td>Seed Banks</td>
<td></td>
</tr>
</tbody>
</table>

## CONNECT IT

Analyze the advantages and disadvantages of trying to save endangered animals by raising them in a zoo.

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conserving 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>Conserving Life</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Biodiversity tends to decrease as you move toward the equator.</td>
<td></td>
</tr>
<tr>
<td>• The loss of habitat is a major reason why many species become endangered.</td>
<td></td>
</tr>
<tr>
<td>• Habitats that have been harmed by human activities cannot be restored.</td>
<td></td>
</tr>
<tr>
<td>• Keeping some endangered animals in captivity can help preserve biodiversity.</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 conserving 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><strong>Before You Read</strong></th>
<th><strong>Our Impact on Land</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>• Population explosion</strong> is a term that describes how the world population has grown rapidly in recent history.**</td>
<td></td>
</tr>
<tr>
<td><strong>• By the time you are 75 years old, you will have produced enough garbage to equal the mass of 11 African elephants.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>• To feed the growing population, farmers are using higher yielding seeds.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>• Most deforestation occurs in developed countries.</strong></td>
<td></td>
</tr>
</tbody>
</table>

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

**Science Journal**

*Write three ways that you can reduce the amount of trash you throw in the garbage.*

---

*Sunshine State Standards—SC.D.2: The student understands the need for protection of the natural systems on Earth.*

*Also covers: SC.G.2*
Our Impact on Land
Section 1 Population Impact on the Environment

Scan Section 1 of your book. Write three facts that you discovered about world population as you scanned the section.

1. 
2. 
3. 

Review Vocabulary
Define natural resource.

natural resource

New Vocabulary
Use your book or a dictionary to define each key term. Then use each in a scientific sentence.

population

carrying capacity

pollutant

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

predict
Population and Carrying Capacity

I found this information on page __________.

Model population growth of modern humans on the grid below. Use the facts given in the five sentences.

1. Human population was ______________ in 1700 A.D.
2. Human population first reached 1 billion in ______________
3. In 1960 A.D., human population was ______________
4. Human population reached 6.1 billion in ______________
5. The population is expected to reach ______________ by 2050 A.D.

Define carrying capacity. Hypothesize about some factors that limit the carrying capacity and things humans could do to increase Earth’s carrying capacity.

Carrying Capacity

<table>
<thead>
<tr>
<th>Limits</th>
<th>Definition</th>
<th>Ways to increase it</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Population Growth of Modern Humans

<table>
<thead>
<tr>
<th>Human Population (billions)</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>100,000 years ago</td>
<td>1700 A.D.</td>
<td>1800 A.D.</td>
<td>1900 A.D.</td>
<td>2000 A.D.</td>
<td>2100 A.D.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Main Idea

Create a concept map to summarize reasons why there is such concern about the growing population.

Details

Complete the chart to show how some of your daily activities consume resources and affect the environment.

How My Activities Affect the Environment

<table>
<thead>
<tr>
<th>Activity</th>
<th>Effect on Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

People and the Environment

I found this information on page _________.

Connect It

Describe how you might be affected at school if suddenly there were twice as many students.

________________________________________________________

________________________________________________________

________________________________________________________
Our Impact on Land
Section 2 Using Land

Benchmarks—SC.D.2.3.2: knows the positive and negative consequences of human action on the Earth’s systems.
Also covers: SC.D.1.3.4, SC.D.2.3.1, SC.G.2.3.4, SC.H.1.3.4, SC.H.3.3.1, SC.H.3.3.4

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

1. _________________________________
2. _________________________________
3. _________________________________

Define erosion to show its scientific meaning.

erosion

Skim through the section to find each term, then give a definition for each from your text.

stream discharge

sanitary landfill

hazardous waste

enzyme

Use a dictionary to define impact.

impact
Organize information about land in the outline.

Land uses and their environmental problems

A. Agriculture
   1. 
   2. Increases soil erosion.

B. Forest Resource Use
   1. 
   2. 

C. Development
   1. Paving stops water from soaking into soil and causes flooding.
   2. 

D. Landfills
   1. 
   2. 

Create a diagram for a sanitary landfill. Be sure to label each element in your plan.

Describe how your landfill will keep pollution from entering the environment.
Section 2 Using Land (continued)

**Main Idea**

**Hazardous Wastes**

I found this information on page _________.

**Details**

**Summarize** characteristics and effects of hazardous waste.

Characteristics:

Effects:

**Identify** four actions by the government and citizens since 1980 that relate to hazardous wastes.

1. __________________________________________

2. __________________________________________

3. __________________________________________

4. __________________________________________

**Classify** the 3 types of national preserves by listing them below.

1. __________________________________________

2. __________________________________________

3. __________________________________________

**Connect It**

List three kinds of hazardous wastes found in many homes. Identify the characteristic that makes each hazardous.
Our Impact on Land
Section 3 Conserving Resources

Benchmarks—SC.D.2.3.1: The student understands that the quality of life is relevant to personal experience.
Also covers: SC.D.2.3.2, SC.G.2.3.4, SC.H.1.3.1, SC.H.1.3.4, SC.H.1.3.6, SC.H.3.3.1, SC.H.3.3.4

Skim the headings and boldfaced terms in Section 3. Then make three predictions about what you will learn.

1. __________________________
2. __________________________
3. __________________________

Define consumption. Then use it in a sentence to show its scientific meaning.

Consumption

Define the following terms. Then use each in a scientific sentence.

Conservation

Composting

Recycling

Use a dictionary to define recover.
Complete the graphic organizer below to show the benefits of conserving resources.

**Main Idea**

**Resource Use**

* I found this information on page ______________.

**Reduce, Reuse, Recycle**

* I found this information on page ______________.

**Details**

**Complete** the statements with the correct percent from the bank.

20% 40% 58% 74%

Paper makes up ________ of the mass of trash. Recycling this paper would use ________ less water and make ________ less pollution than making new paper.

If everyone in the United States composted, it would reduce the trash in landfills by ________.

* Complete the graphic organizer by providing an example of each conservation activity under the correct heading.

**Classify** various conservation activities by providing an example of each under the correct heading.

<table>
<thead>
<tr>
<th>Reduce</th>
<th>Reuse</th>
<th>Recycle</th>
</tr>
</thead>
</table>

Conserving Resources

helps prevent

helps prevent

Our Impact on Land 195
Compare the use of resources by the average person in the United States with the resources used by the average person elsewhere in the world. Use the figure in your book to help you.

<table>
<thead>
<tr>
<th>Resource Use</th>
<th>United States</th>
<th>Rest of world</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil (liters)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel (kg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metals (kg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper (kg)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Identify four recyclable materials.
1. 
2. 
3. 
4. 

Summarize challenges to developing good recycling programs.
1. 
2. 
3. 

Think about the resources listed in the chart above. Describe a strategy for reducing the amount of oil, steel, metals, or paper that you use.
Tie It Together

Create an ad campaign that promotes the conservation of resources. Your campaign may be

• a video,
• a pamphlet,
• posters, or
• flyers.

Choose an audience for your campaign: young children, senior citizens, your peers, your school, or your community.

Then create an informative and inspiring message. Write your message below.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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>Our Impact on Land</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Population explosion is a term that describes how the world population has grown rapidly in recent history.</td>
<td></td>
</tr>
<tr>
<td>• By the time you are 75 years old, you will have produced enough garbage to equal the mass of 11 African elephants.</td>
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<td>• To feed the growing population, farmers are using higher yielding seeds.</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 our impact on land.
Our Impact on Water and Air

Sunshine State Standards—SC.D.2: The student understands the need for protection of the natural systems on Earth. Also covers: SC.G.2

Before You Read

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

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

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

Science Journal

Hypothesize what happens to the water in your home after the water goes down the drain.
Our Impact on Water and Air
Section 1 Water Pollution

Objectives Review the objectives for Section 1. Write three questions that come to mind from reading these statements. Look for answers to these questions as you read the section.

1. 
2. 
3. 

Define pollution using your book or a dictionary.

pollution

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

a chemical that helps plants grow

water that goes into drains and contains human waste, household detergents, and soaps

a substance that destroys pests

pollution that enters water from a specific location such as drainpipes or ditches

pollution that enters a body of water from a large area, that might include lawns, construction sites, and roads

Use a dictionary to define chemical.

chemical
Complete the paragraph about clean water.

Clean water is important because all _____________ need it to live. Plants need water to _____________ . People must _____________ water every day. Many organisms, such as fish, _____________ in water. _____________ can damage organisms. Animals might die or be more likely to get a _____________ .

Summarize the effects of each source of water pollution by completing the table.

<table>
<thead>
<tr>
<th>Sources of Water Pollution and Their Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
</tr>
<tr>
<td>Sediment</td>
</tr>
<tr>
<td>Pesticides</td>
</tr>
<tr>
<td>Fertilizers</td>
</tr>
<tr>
<td>Human waste/sewage</td>
</tr>
<tr>
<td>Metals</td>
</tr>
<tr>
<td>Oil and gasoline</td>
</tr>
<tr>
<td>Heat</td>
</tr>
</tbody>
</table>
Connect It

Identify three ways you use water in your daily life that are not discussed in the book. Choose one of your suggestions and explain how you can change the way you use water to help conserve this vital resource.

<table>
<thead>
<tr>
<th>Reduce Water Pollution</th>
<th>Conserve Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caption:</td>
<td>Caption:</td>
</tr>
</tbody>
</table>
Our Impact on Water and Air

Section 2 Air Pollution

Scan Use the checklist below to preview Section 2 of your book.

☐ Read all section headings.
☐ Read all bold words.
☐ Look at all of the pictures and read their labels.
☐ Think about what you already know about air pollution.

Write two facts that you discovered about air pollution.

1. 

2. 

Define ozone layer using your book or a dictionary.

Ozone layer

Write the correct key term on the blank in the left column.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acidic moisture that falls to Earth as rain or snow</td>
<td>A substance with a pH lower than 7</td>
</tr>
<tr>
<td>Colorless, odorless gas in car exhaust</td>
<td>A colorless, odorless gas that is emitted by cars</td>
</tr>
<tr>
<td>Substance with a pH higher than 7</td>
<td>A substance with a pH higher than 7</td>
</tr>
<tr>
<td>Device that removes sulfur dioxide from smoke produced by a coal-burning power plant</td>
<td>A device used for removing sulfur dioxide from smoke produced by a coal-burning power plant</td>
</tr>
<tr>
<td>Substance with a pH below 7</td>
<td>A substance with a pH lower than 7</td>
</tr>
<tr>
<td>Used to describe the acidity of a substance</td>
<td>The term used to describe the acidity of a substance</td>
</tr>
<tr>
<td>Fine particles such as dust, pollen, mold, ash, and soot that are in the air</td>
<td>Fine particles such as dust, pollen, mold, ash, and soot that are in the air</td>
</tr>
<tr>
<td>Hazy, yellowish-brown smog that sometimes occurs over cities</td>
<td>A type of smog that is hazy and yellowish-brown and occurs over cities</td>
</tr>
</tbody>
</table>

Use a dictionary to define convert as a verb.

Convert
Classify the causes of air pollution discussed in the book as Natural or Produced by Humans. List each cause in the chart.

<table>
<thead>
<tr>
<th></th>
<th>Natural</th>
<th>Produced by Humans</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>

Sequence steps in the formation of smog.

1. 
2. 
3. 
4. 

Create an original drawing in the box to show how acid rain forms. Add labels to your drawing to identify what it shows.
Summarize why CFCs are harmful.

Air Pollution and Your Health

Summarize the health effects of air pollutants in the table.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Health Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon monoxide</td>
<td></td>
</tr>
<tr>
<td>Acid rain</td>
<td></td>
</tr>
<tr>
<td>Particulates</td>
<td></td>
</tr>
</tbody>
</table>

Reducing Air Pollution

Complete the graphic organizer about reducing air pollution.

Ways to Reduce Air Pollution

SYNTHESIZE IT

Why would setting the thermostat in your home at a lower temperature in winter and a higher temperature in summer help reduce air pollution?
Our Impact on Water and Air
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 wrote 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>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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.

☐ 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 water and air pollution.

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
**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
radiation  emission of energy in the form of rays or waves
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
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
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
**Florida Science Academic Vocabulary Glossary**

**erode:** to wear away

**estimate:** (noun) an opinion of the value, quality, size, or cost of something; (verb) to form an opinion by reasoning

**evaluate:** to determine the significance of something

**exclude:** to restrict or stop the entrance of

**expand:** to get bigger

**external:** positioned outside; beyond

**extract:** to take, get, or pull out

**factor:** a substance that functions in a body system

**feature:** part, appearance, or characteristic of something

**function:** (noun) a specific job or purpose; (verb) to carry out a specific action

**fundamental:** original or basic

**goal:** objective or end that one strives to achieve

**hierarchy:** a ranked series or order

**hypothesis:** something that is suggested as being true for the purposes of argument or of further investigation

**identical:** exactly the same; same as

**impact:** a strong, immediate effect

**indicate:** to make known or show; to be or give a sign of; to point out

**individual:** being or characteristic of a single thing

**initial:** of or relating to the beginning; first

**insert:** to put or fit (something) into something else

**interact:** to act upon one another; to influence one another

**intermediate:** in the middle or being between

**internal:** of or on the inside

**interval:** space or time between things

**investigate:** to search into something in order to learn the facts

**item:** object or thing

**layer:** one thickness of something over another, horizon

**likewise:** in the same way

**mechanism:** part or piece of machinery

**medium:** substance through which a force or effect is transmitted

**method:** particular procedure, technique, or way to do something; a process

**neutral:** neither negative nor positive

**normal:** conforming to a type, standard, or regular pattern

**nuclear:** of or relating to the atomic nucleus

**obtain:** to get through effort; gain

**occur:** to happen; to take place

**overlap:** one thing extends over another

**parallel:** everywhere the same distance apart

**passive:** induced by an outside agent

**perceive:** to observe or become aware of through the senses

**percent:** in, to, or for every one hundred

**period:** a repeating interval; row of the periodic table

**phenomenon:** any fact, condition, or happening that can be seen, heard, etc. and described in a scientific way
**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
**Florida Science Academic Vocabulary Glossary**

**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