Science Notebook

Earth Science

Consultant
Douglas Fisher, Ph.D.
About the Consultant

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

Note-Taking Tips .............................................. v
Using Your Science Notebook ......................... vi

## Chapter 1 The Nature of Science
Chapter 1 Preview ...................................... 1
1-1 .................................................................. 2
1-2 .................................................................. 5
Wrap-Up ..................................................... 8

## Chapter 2 Matter
Chapter 2 Preview ...................................... 9
2-1 .................................................................. 10
2-2 .................................................................. 13
2-3 .................................................................. 16
Wrap-Up ..................................................... 20

## Chapter 3 Minerals
Chapter 3 Preview ..................................... 21
3-1 .................................................................. 22
3-2 .................................................................. 25
3-3 .................................................................. 28
Wrap-Up ..................................................... 32

## Chapter 4 Rocks
Chapter 4 Preview ..................................... 33
4-1 .................................................................. 34
4-2 .................................................................. 37
4-3 .................................................................. 40
4-4 .................................................................. 43
Wrap-Up ..................................................... 46

## Chapter 5 Earth’s Energy and Mineral Resources
Chapter 5 Preview ..................................... 47
5-1 .................................................................. 48
5-2 .................................................................. 51
5-3 .................................................................. 54
Wrap-Up ..................................................... 58

## Chapter 6 Views of Earth
Chapter 6 Preview ..................................... 59
6-1 .................................................................. 60
6-2 .................................................................. 63
6-3 .................................................................. 66
Wrap-Up ..................................................... 70

## Chapter 7 Weathering and Soil
Chapter 7 Preview ..................................... 71
7-1 .................................................................. 72
7-2 .................................................................. 75
7-3 .................................................................. 78
Wrap-Up ..................................................... 82

## Chapter 8 Erosional Forces
Chapter 8 Preview ..................................... 83
8-1 .................................................................. 84
8-2 .................................................................. 87
8-3 .................................................................. 90
Wrap-Up ..................................................... 94

## Chapter 9 Water Erosion and Deposition
Chapter 9 Preview ..................................... 95
9-1 .................................................................. 96
9-2 .................................................................. 99
9-3 .................................................................. 102
Wrap-Up ..................................................... 106

## Chapter 10 Plate Tectonics
Chapter 10 Preview ................................107
10-1 .............................................................. 108
10-2 .............................................................. 111
10-3 .............................................................. 114
Wrap-Up ..................................................... 118

## Chapter 11 Earthquakes
Chapter 11 Preview ................................119
11-1 .............................................................. 120
11-2 .............................................................. 123
11-3 .............................................................. 126
Wrap-Up ..................................................... 130

## Chapter 12 Volcanoes
Chapter 12 Preview ................................131
12-1 .............................................................. 132
12-2 .............................................................. 135
12-3 .............................................................. 138
Wrap-Up ..................................................... 142

## Chapter 13 Clues to Earth’s Past
Chapter 13 Preview ................................143
13-1 .............................................................. 144
13-2 .............................................................. 147
13-3 .............................................................. 150
Wrap-Up ..................................................... 154
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Preview</th>
<th>14-1</th>
<th>14-2</th>
<th>14-3</th>
<th>Wrap-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Geologic Time</td>
<td>Chapter</td>
<td>155</td>
<td>156</td>
<td>159</td>
<td>162</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Atmosphere</td>
<td>Chapter</td>
<td>167</td>
<td>168</td>
<td>171</td>
<td>174</td>
</tr>
<tr>
<td>16</td>
<td>Weather</td>
<td>Chapter</td>
<td>179</td>
<td>180</td>
<td>183</td>
<td>186</td>
</tr>
<tr>
<td>17</td>
<td>Climate</td>
<td>Chapter</td>
<td>191</td>
<td>192</td>
<td>194</td>
<td>196</td>
</tr>
<tr>
<td>18</td>
<td>Ocean Motion</td>
<td>Chapter</td>
<td>201</td>
<td>202</td>
<td>205</td>
<td>208</td>
</tr>
<tr>
<td>19</td>
<td>Oceanography</td>
<td>Chapter</td>
<td>213</td>
<td>214</td>
<td>217</td>
<td>220</td>
</tr>
<tr>
<td>20</td>
<td>Our Impact on Land</td>
<td>Chapter</td>
<td>225</td>
<td>226</td>
<td>229</td>
<td>232</td>
</tr>
<tr>
<td>21</td>
<td>Our Impact on Water and Air</td>
<td>Chapter</td>
<td>237</td>
<td>238</td>
<td>241</td>
<td>244</td>
</tr>
<tr>
<td>22</td>
<td>Exploring Space</td>
<td>Chapter</td>
<td>245</td>
<td>246</td>
<td>249</td>
<td>252</td>
</tr>
<tr>
<td>23</td>
<td>The Sun-Earth-Moon System</td>
<td>Chapter</td>
<td>257</td>
<td>258</td>
<td>261</td>
<td>264</td>
</tr>
<tr>
<td>24</td>
<td>The Solar System</td>
<td>Chapter</td>
<td>269</td>
<td>270</td>
<td>273</td>
<td>276</td>
</tr>
<tr>
<td>25</td>
<td>Stars and Galaxies</td>
<td>Chapter</td>
<td>283</td>
<td>284</td>
<td>287</td>
<td>290</td>
</tr>
<tr>
<td></td>
<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>
<td></td>
</tr>
<tr>
<td></td>
<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>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Academic Vocabulary**

297
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.

**Science Journal**
Write about what you know.

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

**Academic Vocabulary**

- emerge: to come out; to appear
- enormous: having great size
- environment: the physical, chemical, and biotic factors that surround living things
- erode: to wear away
- eventual: ultimately resulting
- exceed: to go beyond or be greater than
- expose: to leave open or without protection; to reveal

- formula: a group of symbols and figures showing the elements in a chemical compound
- goal: objective or end that one strives to achieve
- hypothesis: a reasonable guess that can be tested and is based on what is known and what is observed
- impact: a strong effect
- indicate: to be or give a sign of
- inference: a conclusion or an opinion by reasoning
- interval: space or time between events
- layer: one thickness over another
- likewise: in the same way
- locate: to find the position or site of
- maintain: to continue; to support
- normal: conforming to a type; standard or regular pattern
- nucleus: of or relating to the atomic nucleus

**Vocabulary Development**
Vocabulary words help you to better understand your science lessons. Learning the Academic Glossary can help you score higher on standardized tests.
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.

<table>
<thead>
<tr>
<th>The Nature of Science</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A part of science is testing or experimenting.</td>
<td></td>
</tr>
<tr>
<td>• Technology is useful only in the situation for which it was designed.</td>
<td></td>
</tr>
<tr>
<td>• People began studying weather in the 1800s.</td>
<td></td>
</tr>
<tr>
<td>• Science can answer all of the questions that can be asked.</td>
<td></td>
</tr>
</tbody>
</table>

Review
Use the checklist to help you study
• Review the information you included in your Foldable.
• Review 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.

Study the definitions of vocabulary words.
Review the information you included in your Foldable.
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.

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

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

## Before You Read

Before you read the chapter, respond to these statements.

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

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>The Nature of Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>• An important part of science is testing, or experimenting.</td>
<td></td>
</tr>
<tr>
<td>• Technology is useful only in the situation for which it was designed.</td>
<td></td>
</tr>
<tr>
<td>• People began studying weather in the 1800s.</td>
<td></td>
</tr>
<tr>
<td>• Science can answer all of the questions that can be asked.</td>
<td></td>
</tr>
</tbody>
</table>

---

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

**Science Journal**

How do you think scientists could learn more about a clump of stone that could be a small dinosaur heart?

---

The Nature of Science
Section 1 Science All Around

Scan Section 1 of your book, reading all section titles and bold words. Then write three facts that you have learned about the nature of science and scientific investigation.

1. 
2. 
3. 

Define analyze to show its scientific meaning.

Write a sentence that contains both terms from each pair.

hypothesis/control

scientific methods/Earth science

variable/independent variable

constant/dependent variable

science/technology

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

Mysteries and Problems
I found this information on page ___________.

Details

Summarize why it was important for scientists to solve the mystery of the tsunami that struck Japan, on January 27, 1700.

Sequence the scientific methods used to solve a scientific problem by completing the graphic organizer below.

Gather information.

Test the hypothesis.

Distinguish topics that Earth scientists study by listing specific topics identified in this section.

1. __________________  7. __________________
2. __________________  8. __________________
3. __________________  9. __________________
4. __________________ 10. __________________
5. __________________ 11. __________________
6. __________________ 12. __________________
Main Idea

**Working in the Lab**

Define the four types of factors in a science experiment. Identify and describe each of them below.

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>variables that do not change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
<td>the standard to which results can be compared</td>
</tr>
</tbody>
</table>

**Details**

**Technology**

Summarize transferable technology by defining the term. Then provide examples by filling out the graphic organizer below.

Transferable technology is ________________________________.

Radar and Sonar

originally developed for

are now used to study

Identify three objects in your home or school that have not been affected by technology.

______________________________

______________________________

______________________________
Skim through Section 2 of your book. Write three questions that come to mind from reading the headings and examining the illustrations.

1. 
2. 
3. 

Define observation to show its scientific meaning.

observation

Use your book to define the following terms.

scientific theory

scientific law

ethics

bias

Use a dictionary to define objective as an adjective.

objective
Summarize how the manner in which people observe natural phenomena has changed over time.

Organize types of weather information that can be measured. Complete the graphic organizer below.

Distinguish between a scientific theory and a scientific law.
Complete the following paragraph by filling in the missing terms from the word bank.

- bad
- ethics
- explain
- good
- limited
- observed
- scientific methods
- tested

Science is _____________ by what it can _______________.

For a question or problem to be studied through _______________, there must be variables that can be _______________, measured, and _______________. Questions that deal with _______________ or belief systems cannot be answered by science. Ethics is a system of understanding what is _______________ or _______________.

Contrast ethical behavior in science with scientific fraud. Create a table that lists three specific behaviors that are examples of each type of behavior.

<table>
<thead>
<tr>
<th>Ethical Behavior</th>
<th>Scientific Fraud</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SYNTHESIZE IT

Describe how fraud in scientific research could affect other scientists who research in ethical ways.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
The Nature of Science 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 with these.

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

<table>
<thead>
<tr>
<th>The Nature of Science</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• An important part of science is testing, or experimenting.</td>
<td></td>
</tr>
<tr>
<td>• Technology is useful only in the situation for which it was designed.</td>
<td></td>
</tr>
<tr>
<td>• People began studying weather in the 1800s.</td>
<td></td>
</tr>
<tr>
<td>• Science can answer all of the questions that can be asked.</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 the nature of science.
## 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.

### Matter

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• When different kinds of atoms combine, they form matter with properties that are different from those of the original atoms.</td>
</tr>
<tr>
<td></td>
<td>• There are about 900 naturally occurring elements on Earth.</td>
</tr>
<tr>
<td></td>
<td>• An atom is stable when it has six electrons in its outer energy level.</td>
</tr>
<tr>
<td></td>
<td>• An object that is less dense than water will float in water.</td>
</tr>
</tbody>
</table>

---

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

---

*Science Journal*

What is matter made of, and how can it take such varied forms? Write what you know now, and compare it with what you learn after you read the chapter.

---

---

---

---

---

---

---

---

---
Scan the headings in Section 1 of your book. Identify three topics that will be discussed.

1. 
2. 
3. 

Define mass using your book or a dictionary.

mass

New Vocabulary

Use your book or a dictionary to explain the differences between the vocabulary terms in each set.

matter
atom
element

proton
neutron
electron

atomic number
mass number
isotope

Academic Vocabulary

Use a dictionary to define sum to show its meaning in science and math.

sum
Section 1  Atoms (continued)

**Main Idea**

**The Building Blocks of Matter**

Identify the 2 characteristics that determine the properties of matter. List them below.

1.  
2.  

Complete the graphic organizer below to identify two characteristics of elements that make elements different from other kinds of matter.

<table>
<thead>
<tr>
<th>Characteristics of Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Details**

Define the 3 basic particles of an atom in the chart below.

<table>
<thead>
<tr>
<th>Basic Particles of an Atom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Particle</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
</tbody>
</table>

I found this information on page _________.
Model the current atomic model of the atom.

Create models to illustrate an atom or ion with each of the following: no charge or neutral; a positive charge; and a negative charge. Be sure to label the particles that make up each atom.

CONNECT IT

Use a periodic table to find the element that has the atomic number 80. Identify the element, the number of protons the element has, and indicate whether the element is a metal, a nonmetal, or a metalloid.
Skim Section 2 of your book. Write three questions that come to mind. Look for answers to your questions as you read the section.

1. ____________________________
2. ____________________________
3. ____________________________

Define force using your book or a dictionary.

Read each definition. Use your book to write the correct vocabulary term on the line next to each definition.

- negatively or positively charged atom
- composed of two or more substances that are not chemically combined
- a mixture that is evenly mixed throughout, also known as a homogeneous mixture
- atoms of more than one type of element that are chemically bonded together
- group of atoms held together by covalent bonds
- mixture that is evenly mixed throughout
- mixture that is not mixed evenly and each component retains its own properties

Use a dictionary to define formula to show its scientific meaning.
Section 2 Combinations of Atoms (continued)

Main Idea

Interactions of Atoms

I found this information on page __________.

Details

Organize information about the interactions of atoms by completing the outline below.

I. Interactions of Atoms
   A. Compounds
      1. ____________________________________________
         ____________________________________________
      2. ____________________________________________
         ____________________________________________
      3. ____________________________________________
         ____________________________________________
   B. Chemical Properties
      1. ____________________________________________
         ____________________________________________
      2. ____________________________________________
         ____________________________________________

Predict how an atom with an unstable outer energy level will likely form a chemical bond with another atom.

__________________________________________________

__________________________________________________

Complete the graphic organizer below to identify the types of chemical bonds that form compounds.

Bonding

I found this information on page __________.

I found this information on page __________.

I found this information on page __________.

Name ___________________________ Date ________________

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

14 Matter
A kitchen contains the following: lemonade, snack mix, mixed seasonings, vinegar, olives in water, and carbonated water. Classify each of these as a homogeneous mixture or a heterogeneous mixture.
Matter
Section 3 Properties of Matter

Scan the What You’ll Learn statements in Section 3 of your book.
Identify three topics that will be discussed in this section.

1. ____________________________
2. ____________________________
3. ____________________________

**Review Vocabulary**

Define energy using your book or a dictionary.

energy

- ____________________________
- ____________________________
- ____________________________

**New Vocabulary**

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

density

- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________

**Academic Vocabulary**

Use a dictionary to define volume to show its scientific meaning. Then write a sentence that includes the word.

volume

- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
Main Idea

Physical Properties of Matter
I found this information on page __________.

States of Matter
I found this information on page __________.

Changing the State of Matter
I found this information on page __________.

Details

Definition: physical property. Then write five examples of physical properties.

Examples: ____________________________________________________________

Classify the different states of matter by completing the graphic organizer below.

Predict how each of the following conditions would affect the state of matter.

Liquid matter reaches its freezing point: ______________________________

Liquid matter reaches its boiling point: ______________________________

Pressure on liquid matter near its boiling point is decreased: ______________________________
**Main Idea**

**Changes in Physical Properties**

*Contrast* the way that the density of water changes when it freezes with the way the density of most other materials changes when those materials turn solid.

<table>
<thead>
<tr>
<th>Contrasting Density of Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
</tr>
<tr>
<td>Most other materials</td>
</tr>
</tbody>
</table>

**Matter on Mars**

*Summarize* three scientific explanations of where the water that once existed on Mars may have gone.

1. ____________________________
   ____________________________
   ____________________________

2. ____________________________
   ____________________________
   ____________________________

3. ____________________________
   ____________________________
   ____________________________

**SYNTHESIZE IT**

Predict whether a copper penny would float or sink when dropped into a pan of melted copper. Support your reasoning with information from this section.

__________________________
__________________________
__________________________
Tie It Together

What’s the matter?

Analyze the two samples of matter below by answering the following questions:

1. What are the physical properties of each sample?
   - Sample 1: ___________________________
   - Sample 2: ___________________________

2. Identify each substance as either a mixture or a compound. Explain your reasoning.
   - Sample 1: ___________________________
   - Sample 2: ___________________________

3. Predict whether the matter that makes up each sample could be separated physically, chemically, or not at all. Support your reasoning.
   - Sample 1: ___________________________
   - Sample 2: ___________________________
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 with 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>Matter</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• When different kinds of atoms combine, they form matter with</td>
<td></td>
</tr>
<tr>
<td>properties that are different from those of the original atoms.</td>
<td></td>
</tr>
<tr>
<td>• There are about 900 naturally occurring elements on Earth.</td>
<td></td>
</tr>
<tr>
<td>• An atom is stable when it has six electrons in its outer energy level.</td>
<td></td>
</tr>
<tr>
<td>• An object that is less dense than water will float in water.</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, summarize three main ideas from the chapter.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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>Minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Atoms in a mineral are arranged in an orderly pattern.</td>
</tr>
<tr>
<td></td>
<td>• Minerals are made in the lab from natural materials.</td>
</tr>
<tr>
<td></td>
<td>• Diamonds are so hard they cannot be broken.</td>
</tr>
<tr>
<td></td>
<td>• Minerals are a source of metals and other useful elements.</td>
</tr>
</tbody>
</table>

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

Science Journal

Write two questions that you would ask a gemologist—one who studies gems and gemstones—about the minerals that he or she works with.

Write two questions that you would ask a gemologist—one who studies gems and gemstones—about the minerals that he or she works with.
Minerals
Section 1 Minerals

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

1. __________________________________________________________________________
2. __________________________________________________________________________
3. __________________________________________________________________________

**Review Vocabulary**

**Define** atoms using your book or a dictionary.

**atoms**

__________________________________________________________________________

__________________________________________________________________________

**New Vocabulary**

Use your book to define the following terms.

**mineral**

__________________________________________________________________________

__________________________________________________________________________

**crystal**

__________________________________________________________________________

__________________________________________________________________________

**magma**

__________________________________________________________________________

__________________________________________________________________________

**silicate**

__________________________________________________________________________

__________________________________________________________________________

**Academic Vocabulary**

Use a dictionary to define occur.

**occur**

__________________________________________________________________________

__________________________________________________________________________
Main Idea

What is a mineral?

I found this information on page _________.

Details

Organize the four characteristics shared by all minerals in the concept web below.

The Structure of Minerals

I found this information on page _________.

Model the structure of minerals by using simple geometric shapes or dot patterns to represent atoms arranged in a crystalline pattern.

Summarize how atoms are arranged in minerals.

Name ___________________________ Date ______________________

Section 1 Minerals (continued)
Main Idea

The Structure of Minerals
I found this information on page _________.

Details

Sequence the two processes by which minerals form from solution by completing the diagram below.

Minerals dissolve in water to form a solution

Mineral Compositions and Groups
I found this information on page _________.

Analyze the chart of Elements in Earth’s Crust that is provided in your book, and complete the following sentences.

1. Most of Earth’s crust is made up of only ________ elements.
2. ________ and ________ are the most abundant elements, making up about ________ percent of Earth’s crust.
3. Six other common elements are ________________________________ ________________________________.

Distinguish between a carbonate and a silicate. Then identify two carbonates and two silicates.

______________________________

______________________________

______________________________

______________________________

CONNECT IT

Critique the statement “Coal is an essential mineral for society.”

______________________________

______________________________

______________________________

______________________________
Minerals
Section 2 Mineral Identification

Predict three things that you expect to learn based on the headings in Section 2.

1.________________________________________
   _________________________________________
   _________________________________________

2.________________________________________
   _________________________________________
   _________________________________________

3.________________________________________
   _________________________________________
   _________________________________________

Define physical property using your book or a dictionary.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Write the correct vocabulary term next to its definition.

measure of how easily a mineral can be scratched

________________________________________________________________________

describes the way a mineral reflects light from its surface; can be metallic or nonmetallic

________________________________________________________________________

color of a mineral when it is in powdered form

________________________________________________________________________

physical property of some minerals that causes them to break along smooth, flat surfaces

________________________________________________________________________

physical property of some minerals that causes them to break with uneven, rough, or jagged surfaces

________________________________________________________________________

Use a dictionary to define obvious.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Summarize why attempting to identify a mineral by its color alone may sometimes be deceiving.

Compare and contrast mineral hardness with the hardness of common objects by completing the diagram below.

Mineral Hardness

<table>
<thead>
<tr>
<th>Mohs Scale</th>
<th>Hardness</th>
<th>Common Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talc (softest)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Piece of copper</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steel file</td>
</tr>
<tr>
<td>Diamond (hardest)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Analyze the chart by completing the prompts.

Your fingernail can scratch the minerals ________ and ________.

A streak plate is softer than the minerals ________, ________, ________, and ________.
Main Idea

Physical Properties

Create a concept web that identifies six properties used to identify minerals.

I found this information on page __________.

Details

Identify the unique properties of lodestone and calcite.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>lodestone</td>
<td></td>
</tr>
<tr>
<td>calcite</td>
<td></td>
</tr>
</tbody>
</table>

I found this information on page __________.

CONNECT IT

Suppose you were given an assignment to scratch your name into a piece of glass on a special name plate. Identify which of the following minerals you could use. Which would work best? Support your choices with reasons and examples.

diamond   gypsum   apatite   quartz
Predict three things that might be discussed in Section 3. Read the headings to help you make your predictions.

1. 
2. 
3. 

Define metal using your book or a dictionary.

metal

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

gem

ore

Use a dictionary to define accurate.

accurate
Summarize what distinguishes gems from common samples of minerals.

Complete the chart to list some gems and their uses.

<table>
<thead>
<tr>
<th>Useful Gems</th>
<th>Gem</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rubies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quartz crystals</td>
<td></td>
</tr>
</tbody>
</table>

Sequence the stages from ore, to refined element, to manufactured product.

<table>
<thead>
<tr>
<th>Ore</th>
<th>Element</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>iron</td>
<td></td>
<td>frying pans, nails</td>
</tr>
<tr>
<td>Bauxite</td>
<td></td>
<td></td>
</tr>
<tr>
<td>zinc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ilmenite or rutile</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 3 Uses of Minerals

Main Idea

**Useful Elements in Minerals**

I found this information on page ________.

Details

Complete the flow chart to describe how vein minerals form.

- Metallic elements dissolve in liquid.
- Liquid forms mineral deposits called vein minerals.

**SYNTHESIZE IT**

Infer why aluminum is more expensive than iron or steel.

Compare the availability of aluminum recycling to that of iron or steel. Explain your reasoning.
Tie It Together

Synthesize

Create a concept web to summarize what you have learned about mineral characteristics, composition, identification, and uses. (Hint: You may find it easier to write a list of facts to include, and then organize them into the web.)
After reading this chapter, identify three things that you have learned about minerals.

1. Atomic structure of minerals.
2. Natural sources of minerals.
3. Applications of minerals in technology.
4. Formation processes.
5. Identification techniques.
Rocks

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</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Heat can melt rock.</td>
</tr>
<tr>
<td></td>
<td>• Rocks from lava form only under Earth’s surface.</td>
</tr>
<tr>
<td></td>
<td>• Rocks on Earth change slowly over time.</td>
</tr>
<tr>
<td></td>
<td>• Many rocks form in layers.</td>
</tr>
</tbody>
</table>

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

Science Journal

Are you a rock collector? If so, write two sentences about your favorite rock. If not, describe rocks that you have seen in enough detail that a non-sighted person could visualize them.
Name __________________________________________ Date __________________

Rocks
Section 1 The Rock Cycle

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

1. __________________________________________

2. __________________________________________

3. __________________________________________

**Review Vocabulary**

Define mineral using your book or a dictionary.

*mineral*

__________________________________________

__________________________________________

**New Vocabulary**

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

*rock*

__________________________________________

__________________________________________

__________________________________________

__________________________________________

*rock cycle*

__________________________________________

__________________________________________

__________________________________________

__________________________________________

**Academic Vocabulary**

Use your book or a dictionary to define erode.

*erode*

__________________________________________
Main Idea

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

The Rock Cycle
I found this information on page __________.

Details

Complete the blanks in this description of rock.
Most common rock contains one or more __________________
such as __________________ or __________________.
Rock types may also contain __________________,
______________________, or ____________________.

Classify the three major types of rocks. Complete the graphic organizer.

Model the rock cycle. Draw a diagram showing the ways in which rock can change. Include the five types of rock and the processes through which they can change.
The Rock Cycle

Organize ways that each form of rock can change in the rock cycle. Complete the flowcharts.

<table>
<thead>
<tr>
<th>Starting form</th>
<th>Process</th>
<th>Ending form</th>
</tr>
</thead>
<tbody>
<tr>
<td>magma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>igneous, sedimentary, or metamorphic rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sediment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complete the blanks in the statements about the rock cycle.

In the rock cycle, matter is ________ lost or destroyed. It is ________ and used in other forms. Neither ________, weathering, nor ________ destroys matter.

Summarize It

Choose a form of rock. Then use the rock cycle diagram to describe all the possible ways that rock could form.

[Blank lines for summarization]
Rocks
Section 2 Igneous Rocks

Scan the headings of Section 2. Identify three categories of formation of igneous rocks and three classification groups.
1. __________________, __________________, or __________________
2. __________________, __________________, or __________________

Review Vocabulary

Explain how an element is different from a compound or a mixture.

element

New Vocabulary

Use your book to define the following terms.

igneous rock

lava

intrusive

extrusive

Academic Vocabulary

Use your book or a dictionary to define infer. Then explain why inferring is important to scientists.

infer
Complete the flow chart about lava.

- melts to form
- At the surface it becomes

__________ which rises because it is ____________

Identify two sources of heat that melt rocks beneath Earth’s surface.
1. ________________
2. ________________

Distinguish among the types of igneous rocks and the processes by which they form. Complete the chart.

<table>
<thead>
<tr>
<th>Type of Rock</th>
<th>Characteristics</th>
<th>Formation Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrusive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extrusive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volcanic Glass</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 2 Igneous Rocks (continued)

Main Idea

Classifying Igneous Rocks

I found this information on page ___________.

Sequence the three types of igneous rock. The arrows show how the density, silica content, and iron and magnesium content increase among the types of igneous rock.

Analysis how the characteristics of each type of magma affect how it rises to the surface.

<table>
<thead>
<tr>
<th>Type of Magma</th>
<th>Characteristics</th>
<th>How It Rises to the Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basaltic</td>
<td></td>
<td>oozes out through cracks in ocean floor or spills out of volcanos</td>
</tr>
<tr>
<td>Granitic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andesitic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Synthesize It

Classify the following rocks on the basis of what you have learned from this section. Identify whether each is intrusive or extrusive, and identify its composition as basaltic, granitic, or andesitic.

a) a dark-colored rock containing a high level of iron that formed from magma that cooled beneath Earth’s surface

b) a light-colored rock with high silica content that formed from lava on Earth’s surface
Rocks
Section 3 Metamorphic Rocks

Scan the headings in Section 3. Predict two subjects that you expect will be discussed in this section.

1. ____________________________
2. ____________________________

Define pressure using your book or a dictionary. Then write a sentence that shows its scientific meaning.

pressure

Write the vocabulary term that matches each definition.

____________________________
rock formed when heat, pressure, or fluids act on other rock to change its form, its composition, or both

____________________________
describes metamorphic rock whose mineral grains line up in parallel layers

____________________________
describes metamorphic rock whose mineral grains generally do not form layers

Use a dictionary to define transform.

transform
**Main Idea**

**Formation of Metamorphic Rocks**

-I found this information on page _________.

**Details**

**Organize** information about the processes that can form metamorphic rock.

-Heat and pressure change.

**Sequence** the types of rocks in the process from shale to gneiss.

-shale

-__________

-__________

-__________

-gneiss

**Describe** the formation of foliated rock.

**Describe** the growth of grains in sandstone to change it to quartzite, a nonfoliated rock.
Main Idea

Classifying Metamorphic Rocks

I found this information on page ____________.

Details

Summarize the two textures of metamorphic rocks. Describe each texture and give two examples of rocks with that texture.

Metamorphic Rock

Texture: ________________

Description: ________________

__________________________

__________________________

Examples: ________________

__________________________

Texture: ________________

Description: ________________

__________________________

__________________________

Examples: ________________

__________________________

SYNTHESIZE IT

A planner is designing a new office building. The building will have an open courtyard around it. Analyze what metamorphic rocks the planner might use. Explain why each rock would be useful.
Rocks
Section 4 Sedimentary Rocks

**Skim** Section 4. Write three questions you would like to answer. Find the answers to your questions as you read.

1. ______________________________________________________________________

2. ______________________________________________________________________

3. ______________________________________________________________________

**Define** weathering *using your book or a dictionary*.

*weathering* ______________________________________________________________________

**New Vocabulary**

*Write a sentence from Section 4 that uses each term.*

*sediments* ______________________________________________________________________

*sedimentary rock* ______________________________________________________________________

*compaction* ______________________________________________________________________

*cementation* ______________________________________________________________________

**Academic Vocabulary**

*Use a dictionary to define consist.*

*consist* ______________________________________________________________________
**Main Idea**

### Formation of Sedimentary Rocks

Model the relative ages of sedimentary rock layers. Draw a cross-section of undisturbed sedimentary rocks. Label the oldest and youngest layers.

**Details**

### Classifying Sedimentary Rocks

Identify and define the three types of sedimentary rock in the graphic organizer below.

<table>
<thead>
<tr>
<th>Sedimentary Rocks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### Detrital Sedimentary Rocks

Classify types of detrital sedimentary rock by the size and shape (where shape is relevant) of the particles found in them.

<table>
<thead>
<tr>
<th>Type</th>
<th>Conglomerate</th>
<th>Breccia</th>
<th>Sandstone</th>
<th>Shale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size/shape</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sketch of rock</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

(44 Rocks)
Section 4 Sedimentary Rocks (continued)

Main Idea

Chemical Sedimentary Rocks

I found this information on page ___________.

Organic Sedimentary Rocks

I found this information on page ___________.

Details

Sequence the steps in the formation of chemical sedimentary rocks. Complete the graphic organizer.

1. Minerals are dissolved in water.
2. 
3. 
4. 

Identify two examples of chemical sedimentary rocks.
Examples: ___________________ ___________________

List three organic sedimentary rocks and explain how each forms.
Rock: ___________________
How It Forms: ___________________
__________________________
__________________________

Rock: ___________________
How It Forms: ___________________
__________________________
__________________________

Rock: ___________________
How It Forms: ___________________
__________________________
__________________________

Describe at least four uses for sedimentary rocks in your life.
Rocks   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 with 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>Rocks</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Heat can melt rock.</td>
<td></td>
</tr>
<tr>
<td>• Rocks from lava form only under Earth’s surface.</td>
<td></td>
</tr>
<tr>
<td>• Rocks on Earth change slowly over time.</td>
<td></td>
</tr>
<tr>
<td>• Many rocks form in layers.</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.

**Synthesize It**

The rock cycle is said to have no beginning and no end. Discuss why this is true. Use an example to illustrate your answer.

---

46  Rocks
Earth’s Energy and Mineral Resources

Before You Read

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

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

________________________
________________________
________________________
________________________
________________________
Scan Section 1 of your book, using the checklist below.

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

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

1. 
2. 
3. 

Define fuel.

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

resource

nonrenewable resource

conservation

Use a dictionary to define extract.
Complete the paragraph below to describe resources and energy.

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

Organize information about fossil fuels by completing the outline.

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

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

### Formation of Coal

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>Energy Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>peat</td>
<td>contains _______ energy</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>contains _______ energy</td>
</tr>
</tbody>
</table>
Fossil Fuels

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

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

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

Sequence the steps in a nuclear chain reaction.

__________ are fired at fuel rods containing ____________.

Neutrons hit ____________ atoms. The atoms split apart, releasing ____________ and ____________.

More ____________ atoms split, releasing more ____________ and more ____________.
Earth’s Energy and Mineral Resources
Section 2 Renewable Energy Resources

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

1. 

2. 

3. 

**Define** the scientific term energy using your book or a dictionary.

**New Vocabulary**

- energy
- renewable resource
- geothermal energy
- biomass energy

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

**Academic Vocabulary**

- derive

**Use a dictionary to define derive.**
Section 2 Renewable Energy Resources (continued)

Main Idea

Renewable Energy Resources

I found this information on page _________.

Details

Contrast passive and active solar energy by providing examples.

An example of passive solar energy is ________________

An example of active solar energy is ________________

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

Wind Energy as Source of Electricity

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>

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

I found this information on page _________.

I found this information on page _________.

I found this information on page _________.

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.
Section 2 Renewable Energy Resources (continued)

Main Idea

Renewable Energy Resources

I found this information on page __________.

Other Renewable Energy Resources

I found this information on page __________.

Details

Identify three problems associated with geothermal power.

1. __________________________________________

2. __________________________________________

3. __________________________________________

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

<table>
<thead>
<tr>
<th>Biomass Energy</th>
<th>Material</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garbage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Skim through Section 3 of your book. Read the headings and look at the illustrations. Write three questions that come to mind.

1. ____________________________________________________________
2. ____________________________________________________________
3. ____________________________________________________________

Define metal using your book or a dictionary.

metal

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

mineral resources

ore

recycling

Use a dictionary to define obtain.

obtain
List the three things that are required for a mineral deposit to be considered an ore.

A mineral deposit is considered an ore when:

1. 

2. 

3. 

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

Ore

Concentrating: __________________

______________________________.

Gangue

Refining: ____________________

______________________________.

Useful ore

Smelting: ____________________

______________________________.
Connect It

Describe specific ways you could practice each of the three ways to conserve mineral resources in your home.

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

Recycling Mineral Resources

Create a graphic organizer to identify three ways to conserve mineral resources.

Nonmetallic Mineral Resources

I found this information on page __________.

I found this information on page __________.
Tie It Together

Evaluate Energy Resources

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

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

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
<th>W</th>
<th>What I want to find out</th>
<th>L</th>
<th>What I learned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<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 that you have learned about Earth’s energy and mineral resources.
Views of Earth

Before You Read

Before you read the chapter, respond to these statements.

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

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Views of Earth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• All mountains form in the same way.</td>
</tr>
<tr>
<td></td>
<td>• Lines of longitude run parallel to the equator.</td>
</tr>
<tr>
<td></td>
<td>• All maps of Earth distort the shapes and sizes of landmasses.</td>
</tr>
</tbody>
</table>

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

Science Journal

Assume that you want to build a home and have a satellite photo to guide you. Describe where you would build your new home and why you would build at your chosen location.
Skim the headings in Section 1. Write three questions that come to mind from reading these headings.

1. __________________________

2. __________________________

3. __________________________

Define landform to show its scientific meaning.

landform

______________________________

______________________________

______________________________

Write the vocabulary term that matches each definition.

______________________________
large, flat area, often found in the interior regions of continents

______________________________
flat, raised area of land made up of nearly horizontal rocks that have been uplifted by forces within Earth

______________________________
mountain in which rock layers are folded

______________________________
mountain formed when blocks of Earth’s crust are pushed up by forces inside Earth

______________________________
mountain made of huge, tilted blocks of rock separated from surrounding rock by faults

______________________________
mountain formed when molten material reaches the surface through a weak area of Earth’s crust

Use a dictionary to define expose.

expose

______________________________

______________________________
Main Idea

Plains
I found this information on page ____________.

Distinguish two reasons that plains are useful for agriculture.

1. __________________________________________

2. __________________________________________

I found this information on page ____________.

Compare and contrast coastal plains and interior plains.

<table>
<thead>
<tr>
<th>Coastal Plains</th>
<th>Interior Plains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>Characteristics</td>
<td></td>
</tr>
</tbody>
</table>

I found this information on page ____________.

Summarize key characteristics of the Great Plains.

The Great Plains are an example of a(n) _____________.

They are located _____________________________. The area is ___________________________. The Great Plains and covered with ___________________________. The Great Plains are made of ___________________________.

Plateaus
I found this information on page ____________.

Compare and contrast plains and plateaus. Complete the Venn diagram with at least three facts.

Plains

Both

Plateaus
Main Idea
Mountains
I found this information on page ________.

Details
Model the four types of mountains. Draw a diagram of each type.

Folded Mountain

Upwarped Mountain

Fault-Block Mountain

Volcanic Mountain

Summarize how mountains form. Give an example of each.

Folded Mountain: ____________________________________________

________________________________________

________________________________________

Upwarped Mountain: ____________________________________________

________________________________________

________________________________________

Fault-Block Mountain: ____________________________________________

________________________________________

________________________________________

Volcanic Mountain: ____________________________________________

________________________________________

________________________________________

CONNECT IT
Use a physical map to identify the landforms in your area.

Name ___________________________ Date ____________

Section 1 Landforms (continued)
Views of Earth
Section 2 Viewpoints

**Preview** the What You’ll Learn statements for Section 2. Predict three topics that will be discussed in this section.

1. 
2. 
3. 

**Review Vocabulary**

Define pole as it is used when describing Earth.

pole

**New Vocabulary**

Define each vocabulary term.

Equator

Latitude

Prime meridian

Longitude

**Academic Vocabulary**

Use a dictionary to define parallel as an adjective. Then find a sentence in Section 2 that contains the term.

Parallel
Main Idea

Latitude and Longitude

Model the system used to measure position on Earth.

- Draw a view of Earth.
- Label important features on the diagram with the following terms.

Diagram:

- equator
- prime meridian
- 90°S latitude
- north pole
- 0° latitude
- 90°N latitude
- south pole

Summarize how latitude and longitude are measured.

Latitude is measured ____________________________

______________________________

Longitude is measured ____________________________

______________________________

Degrees of latitude and longitude are divided into ________________ and ________________.
Main Idea

Time Zones

Organize information about time zones. Complete the outline.

I. Measuring time

A. 

B. 

II. Characteristics of time zones

A. 

B. 

C. 

Calendar Dates

I found this information on page _________.

Summarize what a person should do when crossing the International Date Line. Complete the cause-and-effect diagrams.

- Travel west across the International Date Line
- Travel east across the International Date Line

SYNTHESIZE IT

Look at the map of time zones in your book. Infer why the International Date Line does not follow the 180° meridian exactly.
**Views of Earth**

Section 3 Maps

Scan the section headings, bold words, and illustrations. Write two facts that you discovered as you scanned the section.

1. 

2. 

**Review Vocabulary**

**globe**

Define globe to show its scientific meaning.

**New Vocabulary**

Use your book to define each vocabulary term.

**conic projection**

**topographic map**

**contour line**

**map scale**

**map legend**

**Academic Vocabulary**

Use a dictionary to define physical. Use physical in a sentence to show its scientific meaning.

**physical**
Main Idea

Map Projections

I found this information on page __________.

Define map. Then complete the statements below about map projections.

A map is _________________________________.

A map projection is made when _________________________________.

All map projections ________________ the shapes and sizes of landmasses to some extent.

Compare and contrast Mercator, Robinson, and conic projections.

<table>
<thead>
<tr>
<th></th>
<th>Mercator</th>
<th>Robinson</th>
<th>Conic</th>
</tr>
</thead>
<tbody>
<tr>
<td>How is it made?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What does it show accurately?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How is it used?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize the purpose of a topographic map.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Views of Earth  67
If you were going to map your classroom, which map scale would be better: 1 cm:1 m or 1 cm: 10 m? Explain your reasoning.

---

**Main Idea**

I found this information on page __________.

---

**Details**

Organize *information about contour lines in the concept web.*

Summarize *what a map scale and map legend show.*

Summarize *what geologic maps are and how they are used.*

---

**Geologic Maps**

I found this information on page __________.
Tie It Together

Model

Create a two-dimension physical map of your state in the space provided below. Include the major landforms found in your state. Use symbols to indicate these landforms on the map. Be sure to explain the symbols you use in a map legend. Your map should be proportional to the actual size of your state. Include a map scale to help others determine distances.
Views of Earth  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 with 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>Views of Earth</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All mountains form in the same way.</td>
<td></td>
</tr>
<tr>
<td>• Lines of longitude run parallel to the equator.</td>
<td></td>
</tr>
<tr>
<td>• All maps of Earth distort the shapes and sizes of landmasses.</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

Identify three important ideas in this chapter.
Weathering and Soil

Before You Read

Before you read the chapter, respond to these statements.

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

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

Before You Weathering and Soil Read

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

FOLDABLES

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

SCIENCE JOURNAL

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.
Weathering and Soil
Section 1 Weathering

Scan the headings of Section 1 to determine two main types of weathering that will be discussed.

1. 
2. 

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

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

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

Use a dictionary to define the term process as a noun.
Section 1 Weathering (continued)

Main Idea

Weathering and Its Effects

I found this information on page _________.

Mechanical Weathering

I found this information on page _________.

Details

Sequence the sediment grain types in order of size.

Coarsest ➔ ➔ Finest

Organize information by completing the outline below as you read.

Mechanical Weathering

I. Plants and Animals
   A. ____________________________
   ____________________________
   ____________________________
   B. ____________________________
   ____________________________
   ____________________________

II. Ice Wedging
   A. ____________________________
   ____________________________
   ____________________________
   B. ____________________________
   ____________________________
   ____________________________
   C. ____________________________
   ____________________________
   ____________________________

III. Surface Area
   A. ____________________________
   ____________________________
   ____________________________
   B. ____________________________
   ____________________________
   ____________________________
   C. ____________________________
   ____________________________
   ____________________________
Section 1 Weathering (continued)

Main Idea

Chemical Weathering

I found this information on page __________.

Effects of Climate

I found this information on page __________.

Details

Sequence steps to explain how carbon dioxide causes chemical weathering.

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

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

<table>
<thead>
<tr>
<th>Factors that Affect the Rate of Weathering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>climate</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>rock type</td>
</tr>
</tbody>
</table>

Analyze how oxygen can cause chemical weathering. Discuss where you have seen oxidation around your home.
Weathering and Soil
Section 2 The Nature of Soil

Predict two things that might be discussed in this section on the basis of its title.
1. 
2. 

Define the term profile.

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

- soil
- humus
- horizon
- soil profile
- litter
- leaching

Use a dictionary to define indicate.
Complete the graphic organizer to show the five factors that affect soil formation.

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

Compare and contrast dry soil and moist soil. Create sketches in the top row, and write descriptions in the bottom row.
Section 2  The Nature of Soil (continued)

Main Idea

Soil Profile

I found this information on page __________.

Details

Model a soil profile by drawing and labeling it below.

Organize information about soil structure in the concept map.

Types of Peds

Summarize information about how soil varies in different regions.

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

CONNECT IT

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

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

1. 
2. 
3. 

Use erosion in a scientific sentence.

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

- no-till farming
- contour farming
- terracing

Define the term compensate as it refers to soil.
Evaluate why soil erosion is a serious problem for agriculture.

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

Identify the causes and effects of excess sediment.

Excess sediment is caused by can affect
## Preventing Soil Erosion

I found this information on page ________.

### Connect It

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

---

### Preventing Soil Erosion

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

Model

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

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

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

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

Review
Use this checklist to help you study.

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

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

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Erosional Forces

Preview

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>Erosional Forces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Glaciers can erode rocks and soil.</td>
</tr>
<tr>
<td></td>
<td>• Human activity can increase erosion.</td>
</tr>
<tr>
<td></td>
<td>• Steep slopes can be unsafe for structures such as houses.</td>
</tr>
<tr>
<td></td>
<td>• Planting vegetation can increase erosion.</td>
</tr>
</tbody>
</table>

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

Science Journal

Name three major landforms around the world. Hypothesize what erosional forces helped shape them. Use sketches to help you think about the processes.
### Erosional Forces

#### Section 1 Erosion by Gravity

**Predict** what you will learn about erosion after looking at each illustration in Section 1 of your book.

**Review Vocabulary**

> Write a sentence using the word *sediment* to show its scientific meaning.

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

**New Vocabulary**

**Define** the following key terms by using your book or a dictionary.

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

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

<table>
<thead>
<tr>
<th>mass movement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

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

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

**Academic Vocabulary**

Use a dictionary to define the word *structure*.

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

---

84  *Erosional Forces*
Section 1 Erosion by Gravity (continued)

**Main Idea**

**Erosion and Deposition**

*I found this information on page _________.

**Details**

**Identify** four major agents of erosion.

1. ______________________

2. ______________________

3. ______________________

4. ______________________

**Summarize** how energy affects the ability of agents of erosion to carry and drop sediment. Then describe how this occurs with water.

__________________________

__________________________

__________________________

**Water:** ______________________

__________________________

__________________________

**Mass Movement**

*I found this information on page _________.

**Compare and contrast** characteristics of mass movements by completing the following chart.

<table>
<thead>
<tr>
<th>Mass Movements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Types</strong></td>
</tr>
<tr>
<td>Slump</td>
</tr>
<tr>
<td>Rock slide</td>
</tr>
<tr>
<td>Creep</td>
</tr>
</tbody>
</table>
Model a way to build a house on a hillside. Draw the house and show methods to protect the house from erosion caused by gravity.

**Main Idea**

I found this information on page _________.

**Details**

Model what a slope would look like before and after a mudflow.

Before  

After

**Consequences of Erosion**

I found this information on page _________.

**Analyze** ways to reduce erosion on steep slopes. Complete the graphic organizer below.

Ways to reduce erosion on steep slopes
Erosional Forces
Section 2 Glaciers

Scan the illustration headings in Section 2. Write three true statements about glaciers on the lines below.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Define plasticlike using your book.

plasticlike

________________________________________________________________________
________________________________________________________________________

Write a scientific sentence for each vocabulary word.

glacier

________________________________________________________________________
________________________________________________________________________

plucking

________________________________________________________________________
________________________________________________________________________

till

________________________________________________________________________
________________________________________________________________________

moraine

________________________________________________________________________
________________________________________________________________________

outwash

________________________________________________________________________
________________________________________________________________________

Define accumulate by using a dictionary.

accumulate

________________________________________________________________________
Sequence the steps of glacier formation and movement. The first step has been completed for you.
1. When snow doesn’t melt, it piles up.
2. 
3. 
4. 

Contrast two ways that glaciers erode rock.

<table>
<thead>
<tr>
<th>Plucking</th>
<th>Scouring</th>
</tr>
</thead>
</table>

Summarize the types of glacier deposits in the chart below.

<table>
<thead>
<tr>
<th>Mass Movements</th>
<th>Type</th>
<th>Consists of</th>
<th>Deposited by</th>
<th>Example of landform that is left behind</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Till</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outwash</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Main Idea

Continental Glaciers
I found this information on page __________.

Valley Glaciers
I found this information on page __________.

Details

Identify key facts about continental glaciers. Complete the concept map below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Location Today</th>
</tr>
</thead>
</table>

Create a labeled diagram of a mountain that has been eroded by valley glaciers.

SYNTHESIZE IT

Outside of a town in the Midwest is a long, winding ridge made of sand and gravel. Hypothesize how this landform may have formed.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Erosional Forces
Section 3 Wind

**Skim** the headings in Section 3. Write three questions that occur to you.

1. 

2. 

3. 

**Define** friction using your book or a dictionary.

friction

---

**Read each definition. Write the correct vocabulary word to match on the blank in the left column.**

when windblown sediment strikes rock, the surface of the rock gets scraped and worn away

wind-blown deposits of fine-grained sediments are called

a mound of sand drifted by the wind.

wind removes small particles such as silt and sand and leaves behind heavier, coarser material.

**Write a sentence that shows the meaning of the word eventual.**

---
Section 3 Wind (continued)

Main Idea

Wind Erosion

I found this information on page __________.

Details

Contrast two ways wind differs from other agents of erosion.

1. ________________________________________

2. ________________________________________

Sequence deflation and abrasion in the flowchart. Make a sketch for the process that occurs in each box.

<table>
<thead>
<tr>
<th>Deflation</th>
<th>Abrasion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawing</td>
<td>Drawing</td>
</tr>
<tr>
<td>Description</td>
<td>Description</td>
</tr>
</tbody>
</table>

Contrast sandstorms and dust storms in the chart.

<table>
<thead>
<tr>
<th>Sandstorms</th>
<th>Dust Storms</th>
</tr>
</thead>
<tbody>
<tr>
<td>What particles are carried by the storm?</td>
<td></td>
</tr>
<tr>
<td>What happens?</td>
<td></td>
</tr>
</tbody>
</table>
Reducing Wind Erosion

I found this information on page ____________.

Details

Summarize how plants help conserve soil. Make a sketch to show each effect in the boxes at right.

1. Windbreaks: ________________________________
   ________________________________
   ________________________________
   ________________________________

2. Roots: ________________________________
   ________________________________
   ________________________________
   ________________________________

Complete the statements about loess and sand dunes.

Loess forms when wind blows across _________________. When the sediment is dropped, it forms ________________________________ deposits. Loess deposits often become _________ soils. Sand dunes often form in _________. After the dunes form, they move in the direction that the _________ blows. Sand blows up the _________ side of the dune. It then falls down the _________ side of the dune. This process causes the _________ to move slowly across the desert.

SYNTHESIZE IT

During the 1930s, wind eroded soil from much of the south-central United States (the Dust Bowl). Infer what farming practices might have contributed to the Dust Bowl. Summarize how farmers could have protected their farms.

__________________________
__________________________
__________________________
Imagine that you are a reporter for a newspaper. The town where you live is located near a moraine and along the shore of a large lake. Plan a series of two articles that will explain

i. how erosion and deposition shaped the town’s land

ii. what dangers the town may face from erosion in the future.

Article 1
Topic: Erosion and deposition and the town’s history

Headline: __________________________________________________________

Key Points for Article:

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

Article 2
Topic: Mass wasting

Headline: __________________________________________________________

Key Points for Article:

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________
Erosional Forces  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 with 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>Erosional Forces</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Glaciers can erode rocks and soil.</td>
<td></td>
</tr>
<tr>
<td>• Human activity can increase erosion.</td>
<td></td>
</tr>
<tr>
<td>• Steep slopes can be unsafe for structures such as houses.</td>
<td></td>
</tr>
<tr>
<td>• Planting vegetation can increase erosion.</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 erosional forces.
Before You Read

Before you read the chapter, respond to these statements.

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

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

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

Hoodoos are narrow towers of rock. What processes might have formed hoodoos? What will happen if this process continues?
Skim Section 1 of your book and read the headings. Write three questions that come to mind. Try to answer your questions as you read.

1. __________________________________________________________________________
2. __________________________________________________________________________
3. __________________________________________________________________________

Define erosion.

erosion
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

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

runoff
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

Likewise
Use your book or a dictionary to define likewise.
likewise
____________________________________________________________________________
Section 1 Surface Water (continued)

**Main Idea**

**Runoff**
I found this information on page ___________.

**Water Erosion**
I found this information on page ___________.

**River System Development**
I found this information on page ___________.

**Details**

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

<table>
<thead>
<tr>
<th>Factors Affecting Runoff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

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

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

**Scan** the map of drainage basins in the United States in your text. Identify three major drainage basins.

1. ____________________________________
2. ____________________________________
3. ____________________________________
Sequence the stages of stream development. Complete the flow chart to identify the key features of each stage.

Contrast the roles and locations of dams and levees.

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

As water slows, it .

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

SYNTHESIZE IT

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

1. 

2. 

3. 

Define pore.

Use your book to define the following terms.

permeable

aquifer

water table

geyser

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

**Groundwater Systems**

I found this information on page ________.

**Water Table**

I found this information on page ________.

Details

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

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

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

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

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

Main Idea

Water Table

I found this information on page __________.

The Work of Groundwater

I found this information on page __________.

Details

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

1. __________
2. __________
3. __________
4. __________

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

Caves
Stalactites
Groundwater shapes land.
Stalagmites
Sinkholes

CONNECT IT

Aquifers are important natural resources. Due to human activity, the levels of some aquifers have dropped over time. What problems can this cause for humans?

__________________________

__________________________

__________________________
Scan Section 3 of your text using the checklist below.

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

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

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

Define spring tide.

spring tide

Use your book to define the following terms.

longshore current

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

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

**Causes of Shoreline Erosion**

- Waves
- Longshore Currents
- Tides

Sequence three steps in the erosion process of a rocky shoreline. Create a sketch to help you remember each step.

1. 
2. 
3. 

The Shore

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

Rocky Shorelines

*I found this information on page ______________.*
Main Idea

Sandy Beaches
I found this information on page _____.

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

Details

Summarize how beach sand forms.

Analyze ways that beaches can change.

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

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

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

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

SYNTHESIZE IT

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

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

Test Soil Permeability

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

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

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

Given your results, which material would you use in the yard of a house built on a low area? Explain your response.
Water Erosion and Deposition

Chapter Wrap-Up

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

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

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

Before You Read

Before you read the chapter, respond to these statements.

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

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

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

Science Journal

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

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________
Plate Tectonics
Section 1 Continental Drift

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

1. 
   
2. 
   
3. 

**Review Vocabulary**

Define continent to show its scientific meaning.

continent

**New Vocabulary**

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

continental drift

Pangaea

**Academic Vocabulary**

Use a dictionary to define controversy.

controversy
Main Idea

Evidence for Continental Drift

I found this information on page __________.

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

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

I found this information on page __________.

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

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

**Main Idea**

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

**Details**

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

Wegener’s explanation for continental drift

How: ____________________________________________

___________________________________________

Why: _________________________________________

___________________________________________

**Evaluate It**

Do you think it was reasonable for scientists initially to reject the hypothesis of continental drift? Explain your response.

___________________________________________

___________________________________________

___________________________________________

___________________________________________

___________________________________________

___________________________________________

---

Plate Tectonics
Plate Tectonics
Section 2  Seafloor Spreading

**Predict** three things that might be discussed in Section 2 after reading its headings.

1. 

2. 

3. 

**Define** seafloor. *Then use the word in a sentence.*

use floor

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

seafloor spreading

**Academic Vocabulary**  
Use a dictionary to define interval. *Then use the word in a sentence about magnetic clues to seafloor spreading.*

interval
Section 2 Seafloor Spreading (continued)

Main Idea

Mapping the Ocean Floor

I found this information on page __________.

Details

Summarize how sound waves are used to map the seafloor.

I found this information on page __________.

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

Sequence steps describing seafloor spreading.

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

The less dense material flows ____________________________.

As the seafloor spreads apart, magma is ______________________.
Evidence for Spreading

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

Model the polarity of Earth’s magnetic field today.

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

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

At times, the ____________________________ that pass through Earth have ____________________________ of Earth’s magnetic field are recorded in ____________________________ that forms along ____________________________. Scientists can detect ____________________________ that are ____________________________ to mid-ocean ridges. This occurs on ____________________________.
**Plate Tectonics**

**Section 3 Theory of Plate Tectonics**

**Scan** the headings and illustrations in Section 3. List four features caused by plate tectonics.

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

**Review Vocabulary**

**Define** the review terms to show their scientific meanings.

- converge
- diverge
- transform

**New Vocabulary**

Use your book to define the following terms.

- plate
- plate tectonics
- lithosphere
- asthenosphere
- convection current

**Academic Vocabulary**

Use a dictionary to define rigid.

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

I. A new theory
   A. In the 1960s, a new theory called ________ was developed.

   B. Earth’s ________ and part of the ________ are broken into sections called ________, that move slowly.

II. Details about the theory
   A. The layer of Earth that is broken into sections is called the ________.

   B. The ________ is the plasticlike layer below the ________.

   C. The rigid plates move over the ________.

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

<table>
<thead>
<tr>
<th>Divergent</th>
<th>Convergent</th>
<th>Transform</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 3 Theory of Plate Tectonics (continued)

Main Idea

Causes of Plate Tectonics

I found this information on page ________.

Features Caused by Plate Tectonics

I found this information on page ________.

Testing for Plate Tectonics

I found this information on page ________.

Details

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

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

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

Summarize how the Satellite Laser Ranging System measures plate movement.

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________
Tie It Together

Synthesize It

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

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

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

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

Review

Use this checklist to help you study.

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

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about plate tectonics.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

118   Plate Tectonics
Before You Read

Before you read the chapter, respond to these statements.

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

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Earthquakes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Earthquakes release energy.</td>
</tr>
<tr>
<td></td>
<td>• The interior of Earth has several layers.</td>
</tr>
<tr>
<td></td>
<td>• Earthquake waves travel through all parts of Earth at the same speed.</td>
</tr>
<tr>
<td></td>
<td>• Thousands of earthquakes occur on Earth every day.</td>
</tr>
</tbody>
</table>

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

Write three things that you would ask a scientist studying earthquakes.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Earthquakes
Section 1 Forces Inside Earth

**Preview** the headings in Section 1. Write three topics that you predict will be covered in this section.

1. __________________________________________
2. __________________________________________
3. __________________________________________

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

*plate*  

________________________________________

________________________________________

**New Vocabulary** Write the correct vocabulary term next to each definition.

________________________________________  surface along which rocks move when they break
________________________________________  vibrations caused by the breaking of rock
________________________________________  fault in which rock above the fault surface moves downward in relation to rock below the fault surface
________________________________________  fault in which rock above the fault surface is forced up and over the rock below the fault surface
________________________________________  fault in which rocks on either side of the fault are moving past each other without much upward or downward motion

**Academic Vocabulary** Write an original sentence that uses the term *stress* and shows its scientific meaning.

*stress*  

________________________________________

________________________________________
Main Idea

Earthquake Causes

Define the elastic limit of an object.

Summarize how motion along faults causes earthquakes.

Types of Faults

Distinguish the three types of forces that act on rocks. Complete the graphic organizer.

<table>
<thead>
<tr>
<th>Force</th>
<th>Tension</th>
<th>Shear</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>squeezes rocks together.</td>
<td></td>
</tr>
</tbody>
</table>
Main Idea

I found this information on page __________.

Details

Model each type of fault.

- Draw each type of fault.
- Include labeled arrows to show direction of motion.
- Draw and label another set of arrows to identify the type of force involved.
- Beneath each drawing, write a description of the fault.

Normal Fault

Reverse Fault

Strike-Slip Fault
Earthquakes
Section 2 Features of Earthquakes

**Review Vocabulary**

Define wave to show its scientific meaning.

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

**New Vocabulary**

Write a paragraph about earthquakes, using the new vocabulary terms. Underline each vocabulary term as you use it.

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

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

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

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

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

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

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

**Academic Vocabulary**

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

<table>
<thead>
<tr>
<th>exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Seismic Waves

Sequence the process through which seismic waves form.
1. Moving rocks get caught on each other at faults.
2. 
3. 
4. 

Organize information about the three types of seismic waves. Identify and explain how each wave moves.

Summarize which type of wave causes the most earthquake damage, and explain why.

Most earthquake damage is caused by ________________ because
______________________________________________________________________________
______________________________________________________________________________

Locating an Epicenter

Analyze the three types of seismic waves. Fill in the missing words.

____________________ are the fastest seismic waves, followed by
____________________, which travel about __________ as fast.
____________________ are the slowest seismic waves. If the epicenter
of an earthquake is far away, ____________________ arrive first.
A scientist finds that primary waves from an earthquake arrived at a seismograph, but secondary waves did not. What can the scientist conclude about the path the waves took?
Earthquakes
Section 3 People and Earthquakes

**Skim** Section 3 of your book. Write down three questions that come to mind from reading the headings and examining the pictures and illustrations.

1. 
2. 
3. 

**Define** crest to show its scientific meaning in relation to waves.

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

- magnitude
- liquefaction
- tsunami

**Academic Vocabulary** Use a dictionary to define detect to show its scientific meaning.
Section 3 People and Earthquakes (continued)

Main Idea

Earthquake Activity

I found this information on page ____________.

Details

Summarize information about how earthquakes affect humans by listing one positive and one negative effect.

Positive: ____________________________________________

Negative: ____________________________________________

Distinguish how the Richter scale represents the energy released by an earthquake and the height of the lines on a seismogram.

For every increase of 1.0 on the Richter scale

the height of a line on a seismogram is ____________

32 times greater

Evaluate how different magnitude earthquakes affect humans and cause damage.

<table>
<thead>
<tr>
<th>Richter scale magnitude</th>
<th>1.5</th>
<th>4.0</th>
<th>8.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Felt by humans?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Causes damage?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Distinguish the four factors that can affect how much damage an earthquake causes.

1. ____________________________________________

2. ____________________________________________

3. ____________________________________________

4. ____________________________________________
Section 3 People and Earthquakes (continued)

**Main Idea**

I found this information on page ___________.

**Details**

Define the Mercalli scale by identifying what it describes.

The Mercalli scale describes ____________________________

Analyze how liquefaction occurs and how it damages buildings.

____________________________________________________

____________________________________________________

____________________________________________________

Sequence the events that result in a tsunami.

[Diagram]

Analyze earthquake safety. List three ways to make a home more earthquake-safe.

1. ____________________________

2. ____________________________

3. ____________________________

CONNECT IT

Look at the map in your book showing the risk of damaging earthquakes. What is the risk in your area? Draw a conclusion about the places where the risk is highest.

____________________________________________________

____________________________________________________

____________________________________________________

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.
Tie It Together

Modeling

Construct a model of a building that is designed to resist earthquake damage. Present your model to the class, and explain how it protects against earthquake damage. Plan your model in the space below.
Earthquakes 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 with 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>Earthquakes</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Earthquakes release energy.</td>
<td></td>
</tr>
<tr>
<td>• The interior of Earth has several layers.</td>
<td></td>
</tr>
<tr>
<td>• Earthquake waves travel through all parts of Earth at the same speed.</td>
<td></td>
</tr>
<tr>
<td>• Thousands of earthquakes occur on Earth every day.</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 earthquakes.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Earthquakes
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>Volcanoes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• One volcano in Hawaii has been erupting for hundreds of years.</td>
<td>• Lava is called magma when it reaches Earth’s surface.</td>
</tr>
<tr>
<td>• Lava is called magma when it reaches Earth’s surface.</td>
<td>• All volcanoes have the same type of eruptions.</td>
</tr>
<tr>
<td>• All volcanoes have the same type of eruptions.</td>
<td>• Volcanic activity can form underground rock features.</td>
</tr>
</tbody>
</table>

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

Do all volcanoes begin with violent, explosive eruptions? Write about your current beliefs, then do some research and write about your discoveries.
Predict three topics that might be discussed in Section 1 as you scan the headings and look at the pictures.

1. 
2. 
3. 

Define lava.

lava

Use your book to define each vocabulary term.

volcano

vent

crater

hot spot

area

Use a dictionary to define area as it is used in geography.
Section 1  Volcanoes and Earth’s Moving Plates (continued)

Main Idea

What are volcanoes?
I found this information on page __________.

Effects of Eruptions
I found this information on page __________.

How do volcanoes form?
I found this information on page __________.

Details

Identify two places on Earth that have active volcanoes.
1. __________________
2. __________________

Summarize the effects of volcanic eruptions on people.

<table>
<thead>
<tr>
<th>Product of Eruption</th>
<th>Effect on People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lava</td>
<td></td>
</tr>
<tr>
<td>Ash</td>
<td></td>
</tr>
<tr>
<td>Pyroclastic flow</td>
<td></td>
</tr>
<tr>
<td>Sulfurous gas</td>
<td></td>
</tr>
</tbody>
</table>

Sequence the events that occur as a volcano forms.

1. ______________
2. ______________
3. ______________
4. ______________
5. ______________
Where do volcanoes occur?

I found this information on page ________.

Identify the three places at which volcanoes often form.

1. ________________________________
2. ________________________________
3. ________________________________

Compare and contrast how volcanoes form at divergent and convergent plate boundaries.

<table>
<thead>
<tr>
<th>At Divergent Boundary</th>
<th>At Convergent Boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sequence the events that caused the Hawaiian Islands to form.

An area between Earth’s core and mantle was unusually hot. 

Sequence the events that caused the Hawaiian Islands to form.

1. ________________________________
2. ________________________________
3. ________________________________

Look at the map of volcanoes and plate boundaries in your book. Describe where most volcanoes occur.

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
**Volcanoes**

Section 2 Types of Volcanoes

- **Skim** Section 2 of your book. Write three questions that come to mind as you read the headings and examine the illustrations. Look for the answers as you read.

  1. 
  2. 
  3. 

**Review Vocabulary**

- Define magma.

  magma

**New Vocabulary**

- Use your book to define each vocabulary term.

  shield volcano

  tephra

  cinder cone volcano

  composite volcano

**Academic Vocabulary**

- Use a dictionary to define release as a verb.

  release
Identify the effects of trapped gases on volcanic eruptions.

Cause | Effect on Eruption
-------|---------------------
Gases escape easily from magma. |  
Gases build up to high pressures in magma. | 

Contrast pahoehoe lava and aa lava.

Pahoehoe lava

Aa lava

Compare and contrast the three major types of magma. Identify the characteristics of each type and the type of volcanic eruption to which each leads.

<table>
<thead>
<tr>
<th>Composition of Magma</th>
<th>Basaltic</th>
<th>Granitic</th>
<th>Andesitic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica content</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where it is found</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of eruption</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 2 Types of Volcanoes (continued)

Main Idea

Forms of Volcanoes

I found this information on page __________.

Volcano Types

- Formation
  - Appearance
  - Example

- Formation
  - Appearance
  - Example

- Formation
  - Appearance
  - Example

Details

Organize information about the three types of volcanoes. Complete the graphic organizer.

Summarize It

Describe two factors that control whether an eruption will be quiet or explosive.
Volcanoes
Section 3 Igneous Rock Features

Scan the section headings, boldfaced words, and illustrations. Write three facts that you discovered about rock features.

1. ____________________________________________________________

2. ____________________________________________________________

3. ____________________________________________________________

Define intrude and extrude.

intrude

extrude

Write the vocabulary term that matches each definition.

one of the largest intrusive igneous rock bodies

magma that is forced into a crack that cuts across rock layers and hardens

igneous rock feature formed when magma is squeezed into a horizontal crack between layers of rock and then hardens underground

solid igneous core left behind when a volcano erodes

depression left when the top of a volcano collapses

Use a dictionary to define collapse.

collapse

138 Volcanoes
Define intrusive rock features. Then identify the four most common types of intrusive features.

Intrusive rock features are ____________________________

______________________________

______________________________

______________________________

Compare and contrast batholiths, dikes, and sills by completing the chart below.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Origin, Size, and Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batholiths</td>
<td></td>
</tr>
<tr>
<td>Dikes</td>
<td></td>
</tr>
<tr>
<td>Sills</td>
<td></td>
</tr>
</tbody>
</table>
Main Idea

Other Features
I found this information on page _________.

Details

Sequence events to explain how a volcanic neck forms.

1. _______________________________________
2. _______________________________________
3. _______________________________________
4. _______________________________________

Model the stages of caldera formation by drawing three pictures.

<table>
<thead>
<tr>
<th>Stage 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 2</td>
</tr>
<tr>
<td>Stage 3</td>
</tr>
</tbody>
</table>

Summarize It
Explain how intrusive rock features become visible above ground.

---

Volcanoes
Recently hired by the United States Geological Survey, you notice signs of activity coming from a large composite volcano and predict an eruption within the next few days. The volcano is near several small towns, and the people in these towns must be warned of the danger. On the lines below, prepare a broadcast to warn the townspeople of the eruption. Present your broadcast warning to the class. Include the following topics in your warning:

• Information about composite volcanoes
• The types of hazards that might occur
• What people should do to stay safe
Volcanoes  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 with 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>Volcanoes</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• One volcano in Hawaii has been erupting for hundreds of years.</td>
<td></td>
</tr>
<tr>
<td>• Lava is called magma when it reaches Earth’s surface.</td>
<td></td>
</tr>
<tr>
<td>• All volcanoes have the same type of eruptions.</td>
<td></td>
</tr>
<tr>
<td>• Volcanic activity can form underground rock features.</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 volcanoes.
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></td>
<td>• The footprint of a dinosaur is considered a fossil.</td>
</tr>
<tr>
<td></td>
<td>• Scientists use fossils to learn what an environment was like long ago.</td>
</tr>
<tr>
<td></td>
<td>• The oldest rock layer is always the one found on top.</td>
</tr>
<tr>
<td></td>
<td>• Scientists can determine the age of some rocks.</td>
</tr>
</tbody>
</table>

**FOLDABLES Study Organizer**

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.

<table>
<thead>
<tr>
<th>Fossil 1</th>
<th>Fossil 2</th>
<th>Fossil 3</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>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Clues to Earth’s Past
Section 1 Fossils

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 two 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 three 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?

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________
Clues to Earth’s Past
Section 2 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.
______________________________
______________________________
______________________________

Read each definition below. Write the correct vocabulary term in the blank to the left.
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.
______________________________
______________________________
______________________________
Section 2 Relative Ages of Rocks (continued)

**Main Idea**

**Superposition**

I found this information on page ___________.

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.

---

**Relative Ages**

I found this information on page ___________.

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.
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.

**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>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>Angular</td>
</tr>
<tr>
<td>unconformity</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disconformity</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>Nonconformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

**Matching Up Rock Layers**

*I found this information on page ___________.

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

**SYNTHESIZE IT**

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.
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.

isotopes

Define these key terms to show their scientific meaning.

radioactive decay

radiometric dating

uniformitarianism

Define ratio to show its scientific meaning.

ratio
Section 3 Absolute Ages of Rocks (continued)

Main Idea

Absolute Ages and 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

| Alpha decay | Both | Beta decay |

Create a bar chart to show four half-lives. Then draw a curve connecting the tops of the bars. Label each axis.
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.

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.
Tie It Together

A paleontologist found the following composition of rock layers at a site. The paleontologist concludes that no folding or other disruption has happened to the layers. What can you conclude about the area’s history? Write a summary of your conclusions.

**Top layer:** coal layer made up of altered plant material

**Middle layer:** mix of sandstone and shale, with some tracks made by dinosaurs

**Bottom layer:** limestone with fossils of clams, snails, and sea lilies
Identify three facts about fossils and rock layers that you found interesting.

1. The footprint of a dinosaur is considered a fossil.
2. Scientists use fossils to learn what an environment was like long ago.
3. The oldest rock layer is always the one found on top.
4. Scientists can determine the age of some rocks.
Geologic Time

Before You Read

Preview the chapter title, section titles, and 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>
</table>

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

Science Journal

Describe how an animal or a plant might change if Earth becomes hotter in the next million years.
Geologic Time
Section 1 Life and Geologic Time

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

1. 
2. 

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

**New Vocabulary**

representation of Earth’s history that shows the time units used to divide it

longest subdivision of geologic time

second-longest subdivision of geologic time

subdivision of an era

subdivision of a period

change of species through time

group of organisms that normally reproduce only with other members of their group

process by which organisms that have characteristics that are better suited to an environment have a better chance of surviving and reproducing than those that do not

organism with a three-lobed exoskeleton that was abundant in Paleozoic oceans

large ancient landmass composed of all the continents joined together

**Academic Vocabulary**

*Use a dictionary to define survive.*

survive
Main Idea

Geologic Time

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

Largest subdivision: ____________________________

Examples: ____________________________

Second-largest subdivision: ____________________________

Examples: ____________________________

Third-largest subdivision: ____________________________

Examples: ____________________________

Fourth-largest subdivision: ____________________________

Examples: ____________________________

Complete the table to identify when each of the following key developments in the history of Earth 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>

Details

Organic Evolution

I found this information on page ___________.

Sequence the steps of natural selection as described by Darwin.

1. ____________________________

   ____________________________

   ____________________________

2. ____________________________

   ____________________________

   ____________________________

3. ____________________________

   ____________________________

   ____________________________
Main Idea

Identify two factors that are necessary for natural selection to occur within a species.

1. 
2. 

Organize information about how trilobites evolved over time.

Contrast two theories explaining the extinction of trilobites at the end of the Paleozoic era. Fill in the missing words.

Some scientists believe that the formation of __________________ caused __________________.

Trilobites could not __________________.

Other scientists suggest that __________________ __________________ caused the extinction.

Plate Tectonics and Earth History

I found this information on page ____________.

Trilobites

I found this information on page ____________.

CONNECT IT

Compare and contrast natural selection and artificial selection.

I found this information on page ____________.

Section 1 Life and Geologic Time (continued)
Geologic Time
Section 2 Early Earth History

**Skim** Section 2. Write three questions that come to mind from looking at the headings and illustrations.

1. 
2. 
3. 

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

**life**

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

**Precambrian time**

**cyanobacteria**

**Paleozoic Era**

**Use a dictionary to define hypothesis. Use hypothesis in a sentence to show its scientific meaning.**

**hypothesis**
Section 2 Early Earth History (continued)

**Main Idea**

**Precambrian Time**

I found this information on page ________.

**The Paleozoic Era**

I found this information on page ________.

**Details**

**Summarize** two reasons why little is known about the organisms that lived during Precambrian time.

1. __________________________________________

2. __________________________________________

**Sequence** important events in the evolution of life during Precambrian time. Complete the flowchart.

The first __________________ appeared on Earth. They used __________________ and produced __________________.

[Flowchart placeholders]

**Organize** information about life during the Paleozoic Era. Complete the concept web with examples of life that appeared during the Paleozoic Era.

[Concept web diagram]
Analyze how the characteristics of amphibians and reptiles allowed them to live on land.

### Amphibians

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lungs</td>
<td></td>
</tr>
<tr>
<td>Legs</td>
<td></td>
</tr>
</tbody>
</table>

### Reptiles

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective coating on eggs</td>
<td></td>
</tr>
<tr>
<td>Skin covered with hard scales</td>
<td></td>
</tr>
</tbody>
</table>

Organize information about three possible explanations of the extinctions that took place at the end of the Paleozoic Era.

Possible Explanations

SYNTHESIZE IT

Analyze why rock formations that show the soft parts of Paleozoic organisms are important.
Geologic Time
Section 3  Middle and Recent Earth History

Preview the What You’ll Learn statements for Section 3. Rewrite each statement as a question. Look for the answers as you read.
1. 

2. 

3. 

Review Vocabulary Define dinosaur to show its scientific meaning.


dinosaur

New Vocabulary Use your book to define each vocabulary term.

Mesozoic Era

Cenozoic Era

Academic Vocabulary Use a dictionary to define diverse. Then use the term in an original scientific sentence.


diverse
Organize key information about dinosaurs.

**Organize** key information about dinosaurs.

<table>
<thead>
<tr>
<th>Size</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Details**

The Mesozoic Era

I found this information on page _________.

**Complete** the chart to identify key characteristics of other important organisms from the Mesozoic Era.

<table>
<thead>
<tr>
<th>Description</th>
<th>When They Appeared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds</td>
<td></td>
</tr>
<tr>
<td>Mammals</td>
<td></td>
</tr>
<tr>
<td>Gymnosperms</td>
<td></td>
</tr>
<tr>
<td>Angiosperms</td>
<td></td>
</tr>
</tbody>
</table>
Summarize what happened at the end of the Mesozoic Era to the environment and many species.

Distinguish the two periods that make up the Cenozoic Era
1. ______________, began about _______ million years ago
2. ______________, began about _______ million years ago

Analyze the effects of changes that occurred during the Cenozoic Era. Complete the diagrams.

- Grasslands expanded.
- Continents moved apart.
- Homo sapiens appeared.

Synthesize It
Infer how paleontologists study the behaviors of extinct animals, such as taking care of young.
Tie It Together

You are directing a new movie about prehistoric times. The script you get shows humans interacting with dinosaurs. Write a memo to the scriptwriter explaining why this would not be scientifically accurate. Suggest two other possible settings, one that includes dinosaurs and one that includes humans.

Memo:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Geologic Time  Chapter Wrap-Up

After You Read

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

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

Review

*Use this checklist to help you study.*

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

**SUMMARIZE IT**

After reading this chapter, identify three things that you have learned about geologic time.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Atmosphere

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>Atmosphere</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Earth’s early atmosphere was produced by erupting volcanoes.</td>
</tr>
<tr>
<td></td>
<td>• Nitrogen makes up most of Earth’s atmosphere.</td>
</tr>
<tr>
<td></td>
<td>• Energy from the Moon causes winds and ocean currents.</td>
</tr>
<tr>
<td></td>
<td>• Wind is the movement of air from an area of higher pressure to an area of lower pressure.</td>
</tr>
</tbody>
</table>

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

Science Journal

Write an article describing how you might prepare to climb Mt. Everest.

---

Name ____________________________ Date ____________
Atmosphere
Section 1 Earth’s Atmosphere

**Skim** the headings in Section 1. Then make three predictions about what you will learn.

1. __________________________________________
2. __________________________________________
3. __________________________________________

**Review Vocabulary**

**Define** pressure in a sentence that shows its scientific meaning.

**New Vocabulary**

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

- atmosphere
- ionosphere
- ultraviolet radiation
- chlorofluorocarbon

**Academic Vocabulary**

**Use a dictionary to define trace in terms of a scientific amount.**
Main Idea

Importance of the Atmosphere
I found this information on page __________.

Makeup of the Atmosphere
I found this information on page __________.

Layers of the Atmosphere
I found this information on page __________.

Details

Summarize why Earth’s atmosphere is important to life on Earth.

Compare the amount of gases in the atmosphere by rereading the section and analyzing the circle graph in your book. Then complete the following paragraph.

The gas that makes up most of the atmosphere is __________.
_________ makes up 21 percent of the atmosphere. Oxygen gas is important because _________________________________.
_____________ Although carbon dioxide makes up only 0.03% of the atmosphere it is a concern because _________________________________.

Model the layers of the atmosphere by drawing them. Label and describe the characteristics of each layer.
Main Idea

Atmospheric Pressure

Model how air pressure changes as you go higher in the atmosphere by creating a drawing in which dots represent air molecules. To the right, describe the cause of air pressure.

Air Molecules

Details

Compare the temperature changes that occur as you go higher in the troposphere, stratosphere, mesosphere, and thermosphere. Use the figure in your book to help you.

Temperature in Atmospheric Layers

I found this information on page ________.

Why did many governments around the world agree to ban the production and use of CFCs in the mid-1990s?

I found this information on page ________.
Skim through Section 2 of your book. Write three questions that come to mind from reading the headings and examining the illustrations.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Use your book to define the term evaporation.

energy that is transferred in the form of rays or waves

Use a dictionary to define transfer.

process of water vapor changing to a liquid
Main Idea

Energy from the Sun

I found this information on page _________.

Details

Analyze the figure in your book that shows what percent of the Sun’s energy is absorbed and reflected by Earth. Then, label the circle graph to represent the data.

Compare and contrast the three forms of energy transfer in the chart.

<table>
<thead>
<tr>
<th>Heat Energy</th>
<th>How Energy Is Transferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process</td>
<td></td>
</tr>
<tr>
<td>Radiation</td>
<td></td>
</tr>
<tr>
<td>Conduction</td>
<td></td>
</tr>
<tr>
<td>Convection</td>
<td></td>
</tr>
</tbody>
</table>

Describe the types of energy transfer that occur when you burn your bare feet when walking on hot sand.
Main Idea

The Water Cycle

I found this information on page ________.

Details

Create a flow chart to describe the water cycle.

Earth’s Atmosphere is Unique

I found this information on page ________.

Compare Earth’s atmosphere to the atmospheres of Venus and Mars.

<table>
<thead>
<tr>
<th>Planet</th>
<th>Description of Atmosphere</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venus</td>
<td></td>
</tr>
<tr>
<td>Mars</td>
<td></td>
</tr>
<tr>
<td>Earth</td>
<td></td>
</tr>
</tbody>
</table>

Summarize It

Infer from your reading three ways in which the atmosphere allows for life on Earth.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Atmosphere
Section 3 Air Movement

Scan Section 3 in your book. Then write three ways that moving air affects people.
1. ____________________________
2. ____________________________
3. ____________________________

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

New Vocabulary
Use the following key terms in a sentence that reflects its scientific meaning.
Coriolis effect
jet stream
sea breeze
land breeze

Academic Vocabulary
Use a dictionary to define create.
create
### Main Idea

**Forming Wind**

I found this information on page ________.

### Details

**Sequence** *how heated air and the Coriolis effect form wind.*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The equator receives ____________________________</td>
</tr>
<tr>
<td>2.</td>
<td>As a result, air near the equator is ____________________________</td>
</tr>
<tr>
<td>3.</td>
<td>Dense air moves from ____________________________</td>
</tr>
<tr>
<td>4.</td>
<td>The rotation of Earth causes ____________________________</td>
</tr>
<tr>
<td>5.</td>
<td>Thus, the Coriolis effect causes ____________________________</td>
</tr>
</tbody>
</table>

### Analyze

**Global Winds**

I found this information on page ________.

**Analyse** the models of the surface winds and winds of the upper troposphere in your book. Then complete the following statements.

1. The equatorial doldrums are located at ____________________________ latitude.
2. ____________________________ blow from the east in areas north and south of the equator.
3. ____________________________ move weather systems across most of North America.
4. Most surface wind systems are named ____________________________
5. The jet stream in the United States travels from ____________________________
6. The jet stream travels at the border between ____________________________
Model how air flows where the land meets the sea during the day and at night. Draw the two conditions below using arrows to indicate the direction of air flow.

<table>
<thead>
<tr>
<th>Day</th>
<th>Night</th>
</tr>
</thead>
</table>

1. 
2. 
3. 

Sequence three steps that occurred in each of your drawings above.

<table>
<thead>
<tr>
<th>Day:</th>
<th>Night:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

Describe the role that the Sun’s energy has in creating wind.
Tie It Together

Model

Design a way to model how the curved surface of Earth affects how much direct sunlight the equator receives compared to the north pole. Discuss how you could test your model, and describe what you would hope to observe.

Materials might include: flashlight or lamp, a round object like a basketball, darkened room

1.  
   
2.  

Results:  

Atmosphere
Atmosphere 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 with 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>Atmosphere</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Earth’s early atmosphere was produced by erupting volcanoes.</td>
<td></td>
</tr>
<tr>
<td>• Nitrogen makes up most of Earth’s atmosphere.</td>
<td></td>
</tr>
<tr>
<td>• Energy from the Moon causes winds and ocean currents.</td>
<td></td>
</tr>
<tr>
<td>• Wind is the movement of air from an area of higher pressure to an area of lower pressure.</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 Earth’s atmosphere.

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
Weather

Before You Read

Before you read the chapter, look at the headings throughout the chapter and complete the chart below.

<table>
<thead>
<tr>
<th>What I know</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

Write three questions you would ask a meteorologist about weather.

---

Weather 179
Weather
Section 1 What is weather?

Scan the headings of the paragraphs throughout Section 1. Write a sentence about a topic that interests you.

Define each vocabulary word below.

factor

weather

humidity

relative humidity

dew point

fog

precipitation

Use a dictionary to write a definition of role.

role
Section 1 What is weather? (continued)

**Main Idea**

**Weather Factors**  
*I found this information on page __________.*

**Details**

Organize information about factors that determine the weather by completing the concept map.

```
Factors that determine the weather
```

Contrast the characteristics of low and high air pressure.

<table>
<thead>
<tr>
<th>Air Pressure</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
</table>

**Dew Point**  
*I found this information on page __________.*

Summarize the relationship between the dew point and the amount of water vapor in the air.

---

---
Sequence the steps in cloud formation. The first step is filled in for you.

<table>
<thead>
<tr>
<th>Cloud Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Warm air is forced upward.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

Complete the following concept map about clouds and cloud types.

**Types of Clouds**

- **stratus clouds** appear as **puffy, often with flat bases** at **low to high altitudes**
- **cirrus clouds** appear at **dark**

**CONNECT IT**

A bottle of water sitting on a picnic table has droplets of water covering it. Analyze what this tells you about the temperatures of the water bottle and the air around it.
# Weather

## Section 2 Weather Patterns

**Scan** the headings throughout Section 2. Write three questions about the topics covered in the section.

1. 
2. 
3. 

**Define** barometer *using your book or a dictionary*.

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>barometer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Use your book or a dictionary to define each key term.**

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>air mass</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>front</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>tornado</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>hurricane</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>blizzard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Use a dictionary to define the term accompany.**

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>accompany</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 2 Weather Patterns (continued)

**Main Idea**

**Weather Changes**

Classify the characteristics of air masses according to where they develop by completing the table below.

<table>
<thead>
<tr>
<th></th>
<th>Tropics</th>
<th>Polar regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>warm, dry</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I found this information on page ________.

**Fronts**

Compare and describe the four types of fronts.

<table>
<thead>
<tr>
<th>Fronts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

I found this information on page ________.

**Details**

Model the directions in which winds blow in high- and low-pressure systems of the northern hemisphere. Use arrows to draw the direction the winds move. Then describe the weather associated with each.

<table>
<thead>
<tr>
<th>Low-pressure Winds</th>
<th>High-pressure Winds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I found this information on page ________.
Main Idea

Severe Weather

I found this information on page ________.

Details

Organize the information on severe weather by completing the Venn diagram using the list of items below.

- may be accompanied by damaging hail
- pose danger to people, structures, and animals
- measured by the Fujita scale
- the most powerful type of storm

- occurs in warm, moist air masses along fronts
- violently rotating column of air in contact with ground
- heavy rains can cause flooding
- turns heat from ocean into wind

Thundersstorm

Hurricane

Tornado

All

CONNECT IT

Summarize what actions to take during severe weather.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Weather
Section 3 Weather Forecasts

Scan the headings and look at the illustrations throughout Section 3.
List four things you would like to learn about.

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

Review Vocabulary
Write the correct vocabulary word next to each definition.

__________________________
to predict a condition or event on the basis of observations

New Vocabulary

__________________________
a scientist who studies weather and weather patterns in an
effort to predict changing weather conditions

__________________________
combination of symbols that meteorologists record on a map
showing weather conditions at one specific location

__________________________
line on a weather map drawn to connect locations of equal
temperature

__________________________
line on a weather map drawn to connect points of equal
atmospheric pressure

Academic Vocabulary
Define predict using a dictionary.

__________________________
__________________________
Main Idea

Weather Observations
I found this information on page _________.

Details
Organize information about a meteorologist’s work. List five measurements that a meteorologist takes and four instruments that improve a meteorologist’s ability to predict weather.

Measurements
1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________
5. ____________________________

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

Forecasting Weather
I found this information on page _________.

Compare and contrast isobars and isotherms by completing the Venn diagram. List at least one descriptor in each part of the diagram.

Isobars  

Both  

Isotherms
Section 3 Weather Forecasts (continued)

Main Idea

Forecasting Weather

I found this information on page __________.

Details

Summarize information provided by the spacing of isobars on a weather map by completing the chart.

<table>
<thead>
<tr>
<th>Spacing of Isobars</th>
<th>What spacing indicates about atmospheric pressure</th>
<th>What spacing indicates about wind conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isobars close together</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isobars far apart</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I found this information on page __________.

Evaluate the information you have learned in this chapter to predict whether forecasting the weather will become more accurate or less accurate in the coming years. Support your position with facts.

CONNECT IT

Analyze the information provided by the weather map in your book. Choose a city, and describe the weather it is experiencing.

Evaluate the information you have learned in this chapter to predict whether forecasting the weather will become more accurate or less accurate in the coming years. Support your position with facts.
Tie It Together

Synthesize

You live in a region that sometimes is struck by hurricanes. Describe the plans that you would make to prepare for and respond to a hurricane.

Long-term planning for hurricane

When a hurricane has been predicted

Following a hurricane
Weather  Chapter Wrap-Up

Review the chart that you completed before you read the chapter. Then complete the chart below.

<table>
<thead>
<tr>
<th>What I learned</th>
<th>What I still want to find out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<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 weather.

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________
Climate

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>Climate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Climate is the state of the atmosphere at a specific time and place.</td>
</tr>
<tr>
<td></td>
<td>• The polar zones generally have cooler temperatures because solar radiation hits these zones at a more direct angle.</td>
</tr>
<tr>
<td></td>
<td>• The climate of an area can be affected by a large lake.</td>
</tr>
<tr>
<td></td>
<td>• El Niño and La Niña are climatic events that can disrupt normal temperature and precipitation patterns around the world.</td>
</tr>
</tbody>
</table>

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

Scientific Journal

Write a paragraph explaining what you already know about the causes of seasons.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Climate 191
Climate
Section 1 What is climate?

Scan the Section 1 headings and illustrations. Formulate two questions about this section that come to mind.

1. 

2. 

Define the following key terms to show their scientific meanings.

latitude

climate

tropics

polar zone

temperate zone

affect

Review Vocabulary

New Vocabulary

Academic Vocabulary
Section 1 What is climate? (continued)

Main Idea

**Latitude and Climate**

*I found this information on page __________.

Details

**Identify** and *label* the climate zones on the globe below. Also include:

- the equator
- Tropic of Cancer
- Tropic of Capricorn

**Organize** factors that affect climate on the concept map below.

Other Factors

*I found this information on page __________.

**COMPARE IT**

Contrast the climate of Buffalo, New York and Yuma, Arizona. Discuss the geographical features that affect the two climates.

---

**Climate** 193
Climate
Section 2 Climate Types

**Predict**  Read the title and the headings of Section 2. List three things that might be discussed in this section.

1. __________________________________________
2. __________________________________________
3. __________________________________________

**Review Vocabulary**

Define the following key terms. Use your book or a dictionary to help you.

- regions
- adaptation
- hibernation

**New Vocabulary**

- vary

**Academic Vocabulary**

**Classifying Climates**

I found this information on page __________.

**Complete the following paragraph about climates.**

Wladimir Köppen developed a __________________________
_________________________. He noticed that different types of __________________________
_________________________. He was able to relate __________
_________________________.
Section 2 Climate Types (continued)

Main Idea

Classifying Climates

I found this information on page __________.

Summarize the six major climate zones shown in your book. Describe the important characteristics of each.

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SYNTHESIZE IT

Analyze the two types of adaptations organisms have to climate. Discuss structural and behavioral adaptations, give an example of each, and then tell how both are similar.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Climate
Section 3 Climate Changes

Scan Use the checklist below to preview Section 3 of your book.

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

Write three facts you discovered about climatic changes as you scanned the section.

1. _____________________________________________________________
2. _____________________________________________________________
3. _____________________________________________________________

Define solar radiation using a dictionary.

solar radiation

Write the correct vocabulary term next to each definition.

increase in the average world temperature of Earth
natural heating that occurs when certain gases in Earth’s atmosphere trap heat
climatic event that may occur when trade winds weaken or reverse, and can disrupt normal temperature and precipitation patterns around the world
destruction of woodlands that can result in increased atmospheric carbon dioxide levels
short period of climatic change caused by the tilt of Earth’s axis as Earth revolves around the Sun

Use a dictionary to find the scientific definition of reverse.
Synthesize information from your book to explain why the northern hemisphere has winter at the time when Earth is closest to the Sun.

El Niño and La Niña

Contrast conditions that occur during El Niño years with those that occur during La Niña years in the chart below.

<table>
<thead>
<tr>
<th>El Niño and La Niña</th>
<th>El Niño Year</th>
<th>La Niña Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength of trade winds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water temperature along west coast of South America</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical climate effects</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Complete the paragraph below about climate change.

In the past, Earth’s overall climate has been ________________ and _________________. During the last two million years, Earth’s climate has cycled between ________________ when glaciers advanced and ________________ ________________ when climate was similar to today’s climate.

Sequence events to explain how an erupting volcano can cause short-term climate change.

A volcano erupts adding small particles called aerosols to atmosphere.

The particles block some sunlight from reaching Earth.

Complete the following chart about sunspots.

<table>
<thead>
<tr>
<th>Sunspots</th>
<th>Definition of sunspots</th>
<th>How sunspots affect climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period between 1645 and 1715</td>
<td>Safety warning</td>
<td></td>
</tr>
</tbody>
</table>
Sequence steps explaining the greenhouse effect. The first one has been done for you.

<table>
<thead>
<tr>
<th>The Greenhouse Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Radiation from the Sun strikes Earth's surface.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

Analyze global warming by completing the concept map below.

Global Warming

- Related Human Activities
- Effect on carbon cycle

Synthesize It

Analyze how humans impact Earth’s atmosphere and how it may have long term effects on global climates.
Climate 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 with 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>Climate</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Climate is the state of the atmosphere at a specific time and place.</td>
<td></td>
</tr>
<tr>
<td>• The polar zones generally have cooler temperatures because solar radiation hits these zones at a more direct angle.</td>
<td></td>
</tr>
<tr>
<td>• The climate of an area can be affected by a large lake.</td>
<td></td>
</tr>
<tr>
<td>• El Niño and La Niña are climatic events that can disrupt normal temperature and precipitation patterns around the world.</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 climate.
Ocean Motion

Before You Read

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

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

Record some facts you know about ocean currents, waves, or tides. Include some pictures to show your ideas.

______

______

______

______
Scan the headings in Section 1 of your book. Predict three topics that will be discussed.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Define resource using your book or a dictionary.

resource

Use your book or a dictionary to define the vocabulary terms. Then use each term in a sentence that shows its scientific meaning.

basin

salinity

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

constant
Section 1 Ocean Water (continued)

Main Idea

Importance of Oceans and Origin of Oceans
I found this information on page __________.

Details

Organize information about the importance of oceans by completing the chart below.

<table>
<thead>
<tr>
<th>Importance of Oceans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Use</td>
</tr>
<tr>
<td>Food</td>
</tr>
<tr>
<td>Energy</td>
</tr>
<tr>
<td>Minerals</td>
</tr>
<tr>
<td>Transportation</td>
</tr>
</tbody>
</table>

Model the part of Earth that is covered by oceans by shading in the correct percentage in the blocks below. Each block is equal to ten percent.

Summarize the composition of ocean water by completing the graphic organizer.

Ocean Water contains

- dissolved _______________
- dissolved salts

Examples: ________________, nitrogen, and ________________

Sources: the ________________, respiration, and ________________

Examples: ________________, sulfate, ________________, potassium, and ________________

Sources: ________________ from dissolved ________________ carried by rivers and erupting ________________
Main Idea

I found this information on page __________.

I found this information on page __________.

I found this information on page __________.

Details

Complete the statement about how minerals form in seawater.

As seawater ____________, ions, such as ____________ and sodium, ____________ to form minerals called ____________.

Organize information about salinity in the chart below.

<table>
<thead>
<tr>
<th>Salinity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
</tr>
<tr>
<td>How is it measured?</td>
</tr>
<tr>
<td>How are elements added to seawater?</td>
</tr>
<tr>
<td>How are dissolved elements removed from seawater?</td>
</tr>
</tbody>
</table>

Create an organizer to list three ways people can remove salt from ocean water.

Summarize It

How does a solar desalination plant make use of natural processes of the water cycle and gravity to remove salts and produce freshwater?
Ocean Motion
Section 2 Ocean Currents

Skim Section 2 of your book. Write three questions that come to mind. Look for answers to your questions as you read the section.

1. 
2. 
3. 

Define circulation using your book or a dictionary.

forms when a mass of more dense seawater sinks beneath less dense seawater

causes moving air and water to turn left in the southern hemisphere and turn right in the northern hemisphere due to Earth’s rotation

wind-powered ocean current that moves the upper few hundred meters of seawater horizontally, parallel to Earth’s surface

vertical circulation in the ocean that brings deep, cold water to the ocean surface

Use a dictionary to define layer. Then use the term in a sentence to show its scientific meaning.

layer
Main Idea

Surface Currents

I found this information on page __________.

Describe the characteristics of surface currents by completing the graphic organizer below.

- Parallel to _______________
- Turned by the _______________
- Powered by _______________
- Move in huge, _______________
- Move only the upper _______________
- patterns
- meters of seawater

Complete the sequence to explain how surface currents form.

1. Surface _______________ cause water to ______________ in the ocean.
2. _______________ pulls water off the pile.
3. The Coriolis effect _______________ the water.
4. The surface water _______________ around the piles of water.

Model the direction that surface currents circulate for the areas of Earth listed in the chart by drawing arrows showing the direction of the currents.

<table>
<thead>
<tr>
<th>Surface Currents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Place on Earth</strong></td>
</tr>
<tr>
<td>North of the equator</td>
</tr>
<tr>
<td>South of the equator</td>
</tr>
</tbody>
</table>

I found this information on page __________.
Section 2 Ocean Currents (continued)

Main Idea

I found this information on page _________.

Details

Analyze how surface currents affect climate by completing the flow chart below.

- Surface currents flow _________.

- _________ is released.

- The _________ is warmed.

Upwelling

I found this information on page _________.

Summarize an effect of upwelling.

_______

Density Currents

I found this information on page _________.

Compare information about density currents as they form in the Antarctic and the North Atlantic oceans.

<table>
<thead>
<tr>
<th>Density Currents</th>
<th>Antarctic</th>
<th>North Atlantic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where does it form?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How does it form?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where does it move?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize It

Compare the characteristics of surface currents with those of density currents.

_______
Ocean Motion
Section 3 Ocean Waves and Tides

Scan the What You’ll Learn statements for Section 3 of your book. Identify three topics that will be discussed.

1. ____________________________
2. ____________________________
3. ____________________________

Define energy using your book or a dictionary.

energy

Write a paragraph using the three vocabulary terms.

wave

crest

trough

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

collapsing ocean wave that forms in shallow water and breaks onto the shore

difference between the level of the ocean at high tide and the level at low tide

daily rise and fall of sea level caused by the gravitational pull of the Sun and the Moon on Earth

Use a dictionary to define range to show its meaning in science and math.

range
Main Idea

Waves

I found this information on page __________.

Details

Model a wave below by drawing it and labeling the following parts: crest, trough, wavelength, and wave height.

Summarize information in your book to complete the chart about waves.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How do waves form?</td>
<td></td>
</tr>
<tr>
<td>How does water move in waves?</td>
<td></td>
</tr>
<tr>
<td>What do waves carry?</td>
<td></td>
</tr>
<tr>
<td>When do waves stop forming?</td>
<td></td>
</tr>
<tr>
<td>What affects the height of waves?</td>
<td></td>
</tr>
</tbody>
</table>

Sequence the formation of a breaker onto shore.

1. ___________ slows water at the bottom of a wave near shore.
2. The ___________ of the wave keeps _____________.
3. The top of the wave outruns the bottom and ____________,
   or ____________, onto the shore.
4. ___________ pulls the water back to sea.

Name ___________________________ Date ____________
Section 3 Ocean Waves and Tides (continued)

**Main Idea**

**Tides**

I found this information on page __________.

**Details**

**Complete the graphic organizer about tides.**

<table>
<thead>
<tr>
<th>Tides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are ____________ produced by the ______________.</td>
</tr>
<tr>
<td>Each giant wave is usually 1 to 2 ________ high. Its ____________ is thousands of kilometers long.</td>
</tr>
<tr>
<td><strong>High Tide</strong></td>
</tr>
<tr>
<td>As the crest nears shore, the sea seems to _______________</td>
</tr>
<tr>
<td><strong>Low Tide</strong></td>
</tr>
<tr>
<td>As the trough nears shore, the sea seems to _______________</td>
</tr>
<tr>
<td>The _______________ between the level of the ocean at high tide and the level at low tide is _______________.</td>
</tr>
</tbody>
</table>

**Connect It**

Draw two pictures, one that shows waves forming in wind that is blowing at 5 kilometers per hour and one that shows waves forming in wind that is blowing at 20 kilometers per hour. Describe how the waves in each picture are different.
Tie It Together

Tracking Currents

Goods lost from wrecked ships have been used to track ocean currents. Read about tracking ocean currents in your book. Then, using the map of surface currents in your book, predict where 80,000 pairs of shoes lost overboard by a freighter in the northern Pacific would wash ashore. Explain your prediction, and draw a picture showing the paths the shoes might travel.

Prediction: ___________________________________________________________
Ocean Motion Chapter Wrap-Up

Review the ideas you listed in the chart at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the chart 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 main ideas from the chapter.

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
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>Oceanography</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sediment that originates on land rarely settles as far as the deep ocean floor.</td>
<td></td>
</tr>
<tr>
<td>• Hot water streams out into surrounding seawater through holes and cracks along mid-ocean ridges.</td>
<td></td>
</tr>
<tr>
<td>• The Sun is the source of nearly all of the energy used by organisms in the ocean.</td>
<td></td>
</tr>
<tr>
<td>• Factories sometimes release chemicals into streams that eventually empty into the ocean.</td>
<td></td>
</tr>
</tbody>
</table>

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

Science Journal

Describe characteristics of three marine organisms you are familiar with.
Predict three things that might be discussed as you scan the headings and illustrations of Section 1.

1. 
2. 
3. 

Define magma using its scientific meaning.

magma

Use your book to define the following terms.

abyssal plain

mid-ocean ridge

trench

Use a dictionary to find the scientific definition of locate.

locate
Main Idea

The Ocean Basins
I found this information on page __________.

Details

Model the ocean basin. Label each of the following features in your drawing.

- abyssal plain
- continental shelf
- continental slope
- where new ocean crust forms
- where ocean crust is destroyed
- oceanic trench
- seamount
- volcanic island
- mid-ocean ridge

Distinguish between the continental shelf and the continental slope by inserting one fact into each section of the Venn diagram.
Ridges and Trenches

I found this information on page ___________.

Mineral Resources from the Seafloor

I found this information on page ___________.

**Main Idea**

**Details**

**Sequence** how seafloor is constantly forming and being destroyed.

*At Mid-Ocean Ridges*

*At Subduction Zones*

- new ocean floor forms

**Organize** resources that exist on the continental shelf and in the deep ocean by listing them below.

<table>
<thead>
<tr>
<th>Continental Shelf Deposits</th>
<th>Deep Ocean Water Deposits</th>
</tr>
</thead>
</table>

**CONNECT IT**

Infer why retrieving resources from deep water is such a challenge.

________________________

________________________

________________________

---

216  Oceanography
Oceanography
Section 2  Life in the Ocean

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

1. 
2. 
3. 

Define nutrient using its scientific meaning.

nutrient

Use your book to define each of the following terms. Then write a sentence to show its scientific meaning.

estuary

reef

Use a dictionary to define undergo. Then write a sentence to show its scientific meaning.

undergo
**Main Idea**

**Life Processes**
I found this information on page ___________.

**Details**

Summarize the ways that marine organisms obtain energy by completing the chart below.

<table>
<thead>
<tr>
<th>Name of process used to make food</th>
<th>How food is made</th>
<th>Example of producers</th>
<th>Example of consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photosynthesis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemosynthesis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Classify the organisms that live in the ocean. Complete the graphic organizer below to organize the types. Include descriptions and examples of each type.

Ocean Life

I found this information on page ___________.

- nekton
- organisms that live on ocean floor;
Compare and contrast ocean margin habitats. Identify four margin habitats and at least four examples of organisms that live in each one. Make a sketch of each habitat to help you remember.

1. 
2. 
3. 
4. 

SYNTHESIZE IT

Compare and contrast food webs that rely on chemosynthesis with food webs that depend on photosynthesis.
**Scan** Use the checklist below to preview Section 3 of your book.

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

**Write three facts you discovered about ocean pollution.**

1. 
2. 
3. 

**Define** runoff using its scientific meaning.

**Use your book to define** pollution. Then identify three types of pollution with which you are already familiar.

**Use a dictionary to define** phenomenon using its scientific meaning.
Complete the graphic organizer to identify five types of ocean pollution and their causes or sources.
Summarize the effects of pollution by completing the outline below.

### Effects of Pollution

**I. Delaware to North Carolina rivers and estuaries**

A. Type of pollution—

B. Effects
   1. have killed billions of fish
   2. 

**B. Florida**

A. Type of pollution—

B. Effects
   1. 
   2. 

List five things you can do to reduce ocean pollution. Highlight the way you think would make the most impact.

1. 
2. 
3. 
4. 
5. 

Design a flow chart to show how pollution travels from your location to the ocean.
Tie It Together

Make a diagram of an ocean basin. Include

• the major features of the basin;
• the locations of continental shelf and deep-water resources;
• an example of a food chain;
• two examples of ocean pollution.
Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with 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>Oceanography</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sediment that originates on land rarely settles as far as the deep ocean floor.</td>
<td></td>
</tr>
<tr>
<td>• Hot water streams out into surrounding seawater through holes and cracks along mid-ocean ridges.</td>
<td></td>
</tr>
<tr>
<td>• The Sun is the source of nearly all of the energy used by organisms in the ocean.</td>
<td></td>
</tr>
<tr>
<td>• Factories sometimes release chemicals into streams that eventually empty into the ocean.</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 oceanography.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Our Impact on Land

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>Our Impact on Land</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>
<td></td>
</tr>
<tr>
<td>• To feed the growing population, farmers are using higher yielding seeds.</td>
<td></td>
</tr>
<tr>
<td>• Most deforestation occurs in developed countries.</td>
<td></td>
</tr>
</tbody>
</table>

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

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

- 
- 
- 
- 
- 
-
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. 

Define natural resource using your book or a dictionary.

natural resource

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

population

carrying capacity

pollutant

Use a dictionary to define environment.

environment

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

1. 
2. 
3. 

Define natural resource using your book or a dictionary.

natural resource

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

population

carrying capacity

pollutant

Use a dictionary to define environment.

environment
Main Idea

Population and Carrying Capacity

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.

I found this information on page ____________.

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

<table>
<thead>
<tr>
<th>Carrying Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limits</td>
</tr>
</tbody>
</table>

I found this information on page ____________.
Main Idea

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

Details

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

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

People and the Environment

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

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

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

1. ____________________________
2. ____________________________
3. ____________________________

**Review Vocabulary** Define erosion using your book or a dictionary.

**erosion**

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

**stream discharge**

**sanitary landfill**

**hazardous waste**

**enzyme**

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

**impact**

---

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.
Main Idea

Land Usage
I found this information on page ___________.

Organize information about land usage 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 of a sanitary landfill. Be sure to label each element in your plan.

I found this information on page ___________.

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:**

**Hazardous waste**

**Effects:**

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

1. ____________________________________________________________________

2. ____________________________________________________________________

3. ____________________________________________________________________

4. ____________________________________________________________________

**Classify** the three types of national preserves.

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

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

1. 
2. 
3. 

**Review Vocabulary**

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**

**Academic Vocabulary**

Use a dictionary to define recover.

**recover**
Complete the graphic organizer below to show the benefits of conserving resources.

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

**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 ______.
Main Idea

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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>United States</td>
</tr>
<tr>
<td>Oil (liters)</td>
</tr>
<tr>
<td>Steel (kg)</td>
</tr>
<tr>
<td>Metals (kg)</td>
</tr>
<tr>
<td>Paper (kg)</td>
</tr>
</tbody>
</table>

Identify four recyclable materials.

1. __________________    2. __________________

3. __________________    4. __________________

Summarize challenges to developing good recycling programs.

1. ____________________________________________

2. ____________________________________________

3. ____________________________________________

CONNECT IT

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.
Our Impact on Land  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 with 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>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>
<td></td>
</tr>
<tr>
<td>• To feed the growing population, farmers are using higher yielding seeds.</td>
<td></td>
</tr>
<tr>
<td>• Most deforestation occurs in developed countries.</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 our impact on land.
Our Impact on Water and Air

Before You Read

Preview the chapter, including section titles and section headings. Complete the chart 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.

classification

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

a chemical that helps plants grow

classification

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

classification

a substance that destroys pests

classification

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

classification

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

Use a dictionary to define chemical.

__________________________________________

__________________________________________
Section 1 Water Pollution (continued)

**Main Idea**

Importance of Clean Water

I found this information on page ___________.

Sources of Water Pollution

I found this information on page ___________.

**Details**

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 chart.

<table>
<thead>
<tr>
<th>Sources of Water Pollution and Their Effects</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Effects</td>
</tr>
<tr>
<td>Sediment</td>
<td></td>
</tr>
<tr>
<td>Pesticides</td>
<td></td>
</tr>
<tr>
<td>Fertilizers</td>
<td></td>
</tr>
<tr>
<td>Human waste/ sewage</td>
<td></td>
</tr>
<tr>
<td>Metals</td>
<td></td>
</tr>
<tr>
<td>Oil and gasoline</td>
<td></td>
</tr>
<tr>
<td>Heat</td>
<td></td>
</tr>
</tbody>
</table>
Section 1  Water Pollution (continued)

Main Idea

Reduction Water Pollution

I found this information on page _________.

Details


Create two original drawings that illustrate (1) how people can help to reduce water pollution and (2) how people can help to conserve water. Include captions for each drawing.

How can you help?

I found this information on page _________.

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.

Name ___________________________________________ Date ____________________

240  Our Impact on Water and Air
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.

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

__________________________
acidsic moisture that falls to Earth as rain or snow

__________________________
colorless, odorless gas in car exhaust that contributes to air pollution

__________________________
substance with a pH higher than 7

__________________________
device that removes sulfur dioxide from smoke produced by a coal-burning power plant

__________________________
substance with a pH below 7

__________________________
used to describe how acidic or basic a substance is

__________________________
fine particles such as dust, pollen, mold, ash, and soot that are in the air

__________________________
hazy, yellowish-brown smog that sometimes occurs over cities

Use a dictionary to define convert using its scientific meaning.
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>Natural</th>
<th>Produced by Humans</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>

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.
**Main Idea**

CFCs

*I found this information on page __________.*

**Details**

**Summarize why CFCs are harmful.**

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

**Air Pollution and Your Health**

*I found this information on page __________.*

**Summarize the health effects of air pollutants in the chart.**

<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**

*I found this information on page __________.*

**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?

_________________________________________________________________________
_________________________________________________________________________
Review the ideas you listed in the chart at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the chart 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>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 three main points of the chapter.
Exploring Space

Before You Read

Preview the chapter, including section titles and the section headings. Complete the chart by listing at least one idea for each of the three sections 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>
</table>

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

SciencE Journal

Do you think space exploration is worth the risk and expense? Explain why.

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________
Exploring Space
Section 1 Radiation from Space

Evaluate the objectives found in What You’ll Learn for Section 1. Write three questions that come to mind from reading these statements.

1. 
2. 
3. 

Define telescope using your book or a dictionary.

telescope

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

electromagnetic spectrum

refracting telescope

reflecting telescope

observatory

radio telescope

Use a dictionary to define visible.

visible
Main Idea

Electromagnetic Waves

I found this information on page ___________.

Details

List *seven forms of* electromagnetic radiation.

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

**Compare and contrast** short wavelength radiation *with* long wavelength radiation *by completing the chart below.*

<table>
<thead>
<tr>
<th>Short Wavelength</th>
<th>Long Wavelength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sketch of each wave</td>
<td></td>
</tr>
<tr>
<td>Description of frequency</td>
<td></td>
</tr>
</tbody>
</table>

**Optical Telescopes**

I found this information on page ___________.

**Compare a** refracting telescope *with a* reflecting telescope.
- Use your book to help you draw cross-sections of each telescope.
- Use arrows to indicate the path taken by light in each type.
- Label the eyepiece lens, focal point, and any other mirrors or lenses.
- Model the shapes of a convex lens and a concave mirror.

refracting telescope

reflecting telescope

convex lens

concave mirror
Summarize information about the Hubble Space Telescope by completing the paragraph.

In __________, the ________________________ was launched. Scientists expected clear pictures from this ________________________ telescope because it was ________________________ ________________________. However, a mistake was made when the telescope’s ________________________, so it did not make _________________________. Repair missions were made in (years) ________________________, when small ________________________ were added to correct the images.

Organize information about radio telescopes in the chart below.

<table>
<thead>
<tr>
<th>Purpose:</th>
<th>Radio telescopes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design:</td>
<td></td>
</tr>
<tr>
<td>Collect information used to:</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>

Radio waves from space have been studied for decades, but scientists have yet to find signs of intelligent life. Suggest several explanations for this.
Exploring Space
Section 2 Early Space Missions

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

1. ____________________________________________________
2. ____________________________________________________
3. ____________________________________________________

**Write the correct vocabulary term next to each definition.**

- **force that propels an aircraft or missile**
- **curved path followed by a satellite as it revolves around an object**
- **space mission with goal of landing a human on the Moon’s surface**
- **special engine that can work in space and burns liquid or solid fuel**
- **space mission with goals of connecting spacecraft in orbit and investigating the effects of space travel on the human body**
- **any object that revolves around another object in space**
- **space mission with goal of orbiting a piloted spacecraft around Earth and bringing it back safely**
- **instrument that gathers information and sends it back to Earth**

**Define** the scientific meaning of goal using a dictionary.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________
The First Missions into Space

Compare and contrast the two types of rockets by completing the Venn diagram with the information below.

- can be shut down and restarted
- do not require air for operation
- liquid fuel and oxidizer stored in separate tanks
- preferred for long-term space missions

- gases thrust it forward
- rubberlike fuel contains oxidizer
- generally simpler
- cannot be shut down once ignited

Model the path of a satellite. Draw a satellite in orbit around Earth. Show the complete path of the satellite and the path it would take if it were not affected by gravity.
Section 2 Early Space Missions (continued)

**Main Idea**

**Space Probes**
*I found this information on page __________.*

**Moon Quest**
*I found this information on page __________.*

**Details**

**Compare** the advantages and disadvantages of space probes with spacecraft piloted by humans.

<table>
<thead>
<tr>
<th>Comparison of Space Probes to Piloted Spacecraft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Create** a time line of the United States’ quest to reach the Moon by identifying an event that corresponds to each date.

1. _____________  3. _____________  5. _____________


2. _____________  4. _____________

**CONNECT IT**

Design a plan for a space mission to take humans to Mars. Analyze challenges the crew would have to face. Develop a simple program to help prepare the crew to face these challenges.

[Blank Lines for Student Response]

Exploring Space 251
Exploring Space
Section 3 Current and Future Space Missions

**Skim** through Section 3 of your text. Read the headings and examine the illustrations. Write three questions that come to mind. Try to answer your questions as you read.

1. 

2. 

3. 

**Review Vocabulary**

*Use cosmonaut in a sentence that shows its scientific meaning.*

cosmonaut

**New Vocabulary**

*Use the following key terms in original sentences to show their scientific meaning.*

- space shuttle
- space station

**Academic Vocabulary**

*Define the scientific meaning of technology using a dictionary.*

technology
Main Idea

The Space Shuttle

Summarize characteristics of the space shuttle below.

<table>
<thead>
<tr>
<th>Engines:</th>
<th>Cargo bay:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Landings:</th>
<th>Reusability:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exploring Mars

Organize information about missions to Mars by completing the diagram. Identify each probe by its name and mission.

Exploring Mars

- 1996
- 2002
- 2003
- 2008
**Main Idea**

Exploring the Moon and Cassini

I found this information on page __________.

---

**Details**

Complete the chart with information about the Lunar Prospector and Cassini spacecraft.

<table>
<thead>
<tr>
<th>Spacecraft</th>
<th>Launch Date</th>
<th>Destination</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lunar Prospector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cassini</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Organize information by identifying an example of technology developed for space programs that is useful in everyday life.

**Everyday uses of space technology**

- Transportation and construction
- Medicine
- Law enforcement and safety

---

**CONNECT IT**

Research and construction of the earliest space stations was undertaken by nations working independently. Work on the International Space Station is being performed by many nations working together. Analyze some benefits to such international cooperation in scientific research.
Tie It Together

Synthesize It

Much of today’s planetary research is carried out using remote-controlled rovers that are monitored and maneuvered by scientists on Earth. Suppose that you could design a remote-controlled rover to conduct research on a planet or the Moon.

• Draw a sketch of your rover below.
• Identify features you would include on your rover.
• Explain why you would include each feature.
• Use what you have learned about space technologies in this section.
Exploring Space  Chapter Wrap-Up

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

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

Review

Use this checklist to help you study.

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

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about exploring space.

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
Before You Read

Before you read the chapter, respond to these statements.

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

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>The Sun-Earth-Moon System</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The Sun appears to move across the sky each day.</td>
<td></td>
</tr>
<tr>
<td>• The spinning of Earth on its axis is rotation.</td>
<td></td>
</tr>
<tr>
<td>• The Moon’s rotation and revolution take the same amount of time, so the same side of the Moon always faces Earth.</td>
<td></td>
</tr>
<tr>
<td>• No evidence of water has been found on the Moon.</td>
<td></td>
</tr>
</tbody>
</table>

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

Rotation or revolution—which motion of Earth brings morning and which brings summer?

[Blank lines for responses]
The Sun-Earth-Moon System

Section 1 Earth

Scan the tables and illustrations in Section 1, and write three questions you have about Earth.

1. __________________________________________________________________________
2. __________________________________________________________________________
3. __________________________________________________________________________

Use orbit in a sentence that reflects its scientific meaning.

______________________________________________________________________________
______________________________________________________________________________

Write the correct vocabulary term on each blank.

spinning of Earth on its axis, which causes day and night to occur
Earth’s yearly orbit around the Sun
imaginary line around which Earth spins
elongated, closed curve, such as Earth’s orbit around the Sun
occurs when the Sun is directly above Earth’s equator and the number of daylight and nighttime hours are nearly equal
day when the Sun reaches its greatest distance north or south of the equator
round, three-dimensional object

Define maintain using a dictionary.

______________________________________________________________________________
Section 1 Earth (continued)

Main Idea

Properties of Earth

I found this information on page __________.

Magnetic Field

I found this information on page __________.

Details

Label the diagram of Earth.

- Diameter (pole to pole):
- Diameter (equator):
- Period of rotation (1 day):
- Period of revolution (1 year):

Compare Earth’s magnetic poles with its rotational poles by drawing them on the circle below. Label Earth’s:

- rotational axis
- rotational poles
- north magnetic pole
- south magnetic pole
- the difference in degrees between the magnetic and rotational poles

Summarize why Earth has a magnetic field.

---

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.
Main Idea

What causes changing seasons?

I found this information on page ________.

Solstices and Equinoxes

I found this information on page ________.

Details

Compare facts about summer and winter in the chart.

<table>
<thead>
<tr>
<th>Seasonal Conditions</th>
<th>Summer</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemisphere tilts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours of daylight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solar radiation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperatures</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compare and contrast solstices and equinoxes by completing the Venn diagram using the phrases below.

- caused by tilt of Earth’s axis
- daylight hours and nighttime hours nearly equal
- longest or shortest period of daylight of the year
- occur twice yearly
- Sun at 90° angle to equator
- Sun reaches greatest distance from equator

It takes Earth one year to make a complete revolution around the Sun. Determine how much time passes between one spring equinox and the next. Explain your reasoning.

CONNECT IT
Predict three things that might be discussed in Section 2 based on its title and headings.

1. 
2. 
3. 

Define mantle to show its scientific meaning.

Write the correct vocabulary term next to each definition.

- different ways the Moon appears from Earth
- occurs when the lit side of the moon is not visible; the moon is between Earth and the Sun
- describes the Moon when more of its lighted portion is visible each night
- occurs when all of the Moon’s surface that faces Earth is lit
- describes the Moon when less of its lighted portion is visible each night
- occurs when the Moon moves between the Sun and Earth and casts a shadow over part of Earth
- occurs when Earth moves between the Sun and the Moon and casts a shadow on the Moon
- dark, flat regions on the Moon that formed as lava spread over the surface

Use the term cycle in a sentence that reflects its scientific meaning.
Describe why the face of the Moon that we see does not change.

Analyze the diagram below. Imagine that you are standing on Earth and that the Sun’s rays are coming from the direction shown. Draw a picture showing how the moon would look from Earth at each of the labeled positions. The first one has been done for you.

The Moon cannot be seen from Earth. Its opposite side is lit.
Section 2  The Moon—Earth’s Satellite (continued)

**Main Idea**

**Eclipses**

I found this information on page __________.

**Details**

**Compare** the alignments that cause solar and lunar eclipses by drawing diagrams of the positions of the Sun, the Moon, and Earth relative to one another. Show how the shadow is cast in each case.

**Solar Eclipse**

**Lunar Eclipse**

**Inside the Moon**

I found this information on page __________.

**Summarize** the Moon’s structure according to one model.

<table>
<thead>
<tr>
<th>Surface and Interior of the Moon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone</td>
</tr>
<tr>
<td>Crust</td>
</tr>
<tr>
<td>Upper Mantle</td>
</tr>
<tr>
<td>Lower Mantle</td>
</tr>
<tr>
<td>Core</td>
</tr>
</tbody>
</table>

**Summarize It**

Summarize the impact theory of how the Moon formed.

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

The Sun-Earth-Moon System  263
The Sun-Earth-Moon System
Section 3 Exploring Earth’s Moon

Objectives  Review the objectives for Section 3. Write two questions that come to mind.
1. 
2. 

Define comet using your book or a dictionary. Then write a sentence or make a sketch to show its scientific meaning.
comet

Define impact basin using your book or a dictionary. Then sketch how an impact basin forms.
impact basin

Use a dictionary to define core as it relates to planets and moons. Then sketch the Moon, and show where you think its core is.
core
### Missions to the Moon

I found this information on page ____________.

### Details

**Distinguish** between the following Moon missions by indicating when they took place and what they accomplished.

<table>
<thead>
<tr>
<th>Mission</th>
<th>Year</th>
<th>Accomplishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luna 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveyor 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunar Orbiters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apollo 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apollo 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apollo 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apollo 17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Organize** information about Clementine’s mission by outlining it below.

Clementine’s mission

I. Objectives
   A. 
   B. 

II. Instruments
   A. 
   B. 

III. Discoveries
   A. 
   B. 

---

The Sun-Earth-Moon System 265
Main Idea

Organize information about the Lunar Prospector by completing the diagram.

Details

Lunar Prospector Mission

To map the Moon’s:

Confirmed that the Moon has:

Analyze why the presence of water on the Moon would be a benefit to humans.

Synthesize It

Missions to the Moon have included some with astronauts and some without astronauts. Predict whether astronauts will be sent on Moon missions in the future. Support your position with three facts or examples.
Suppose that you are on a mission to explore the Moon. In the spaces provided, describe what you think you will observe from each location.

From the windows of your spacecraft orbiting the Moon

On the Moon’s surface near the Moon’s equator

On the surface near the Moon’s south pole
The Earth-Moon-Sun System
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 with these.

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

<table>
<thead>
<tr>
<th>The Sun-Earth-Moon System</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The Sun appears to move across the sky each day.</td>
<td></td>
</tr>
<tr>
<td>• The spinning of Earth on its axis is rotation.</td>
<td></td>
</tr>
<tr>
<td>• The Moon’s rotation and revolution take the same amount of time, so the same side of the Moon always faces Earth.</td>
<td></td>
</tr>
<tr>
<td>• No evidence of water has been found on the Moon.</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 the Sun-Earth-Moon system.

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

268  The Sun-Earth-Moon System
Before You Read

Before you read the chapter, respond to these statements.

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

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>The Solar System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• The planets revolve around Earth.</td>
</tr>
<tr>
<td></td>
<td>• The solar system is more than 4.6 billion years old.</td>
</tr>
<tr>
<td></td>
<td>• Mercury has an atmosphere similar to Earth’s.</td>
</tr>
<tr>
<td></td>
<td>• Uranus has craters and deep valleys.</td>
</tr>
<tr>
<td></td>
<td>• Earth is the only planet known to be able to support life.</td>
</tr>
</tbody>
</table>

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

Science Journal

If you could command the Keck telescope, what would you view? Describe what you would see.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
The Solar System

Section 1 The Solar System

**Skim** the headings in Section 1. Write three things you expect to learn in Section 1.

1. __________________________
   __________________________
   __________________________

2. __________________________
   __________________________
   __________________________

3. __________________________
   __________________________
   __________________________

**Review Vocabulary**

Define system using your book or a dictionary. Give an example of a system.

- system

**New Vocabulary**

Write a scientific sentence describing the solar system.

- solar system

**Academic Vocabulary**

Define contract as a verb, using a dictionary. Then rewrite the following sentence, using the word contracted.

Over time, the cloud of gas and dust became smaller, forming a large, tightly packed, spinning disk.

- contract
Contrast the Earth-centered model of the solar system and the Sun-centered model of the solar system in the chart below.

<table>
<thead>
<tr>
<th></th>
<th>Earth-centered</th>
<th>Sun-centered</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many planets are in the system?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describe motions in the system.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Evaluate how Galileo’s discoveries provided evidence for the Sun-centered model of the solar system. Complete the statements.

Galileo discovered that the planet _____________ went through ____________ like our _____________. These changes could occur only _____________________________.

Create a drawing of the solar system.

- Draw and label the Sun and the planets in the correct order.
- Identify which planets were included in the Earth-centered model of the solar system by putting a check mark beside those.
How the Solar System Formed

Sequence the steps in the formation of the solar system.

1. ______________________________________________________________________
2. ______________________________________________________________________
3. ______________________________________________________________________
4. ______________________________________________________________________

Classify the nine planets as inner or outer planets, using the chart below. Identify a characteristic of each group of planets.

<table>
<thead>
<tr>
<th>The Nine Planets</th>
<th>Inner</th>
<th>Outer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Names of Planets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristics</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize how ideas about the structure and motions of the solar system changed over time.
The Solar System
Section 2 The Inner Planets

Scan the headings of Section 2. Write a question for each heading.

Mercury: ____________________________________________

Venus: ____________________________________________

Earth: ____________________________________________

Mars: ____________________________________________

Define space probe using your book or a dictionary.

space probe

Write a scientific sentence using each vocabulary term.

Mercury

Venus

Earth

Mars

Use a dictionary to define reveal.

reveal
Organize key facts about Mercury. Complete the chart.

<table>
<thead>
<tr>
<th>Mercury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
</tr>
<tr>
<td>Surface</td>
</tr>
<tr>
<td>Core</td>
</tr>
<tr>
<td>Atmosphere</td>
</tr>
<tr>
<td>Temperature</td>
</tr>
<tr>
<td>Explored By</td>
</tr>
</tbody>
</table>

Complete the graphic organizer to identify key features of Venus.

Summarize unique features of Earth that allow it to support life.
Main Idea

Mars

I found this information on page ________.

Details

Summarize important information about Mars.

- Surface Features
- Space Probes
- Atmosphere
- Seasons
- Moons

SYNTHESIZE IT

Compare and contrast the inner planets. Choose one feature, such as temperature, size, or atmosphere, and write a paragraph comparing and contrasting this feature for the four inner planets.
The Solar System
Section 3 The Outer Planets

Skim Section 3. Predict two ways in which the outer planets differ from the inner planets.
1.
2.

Define the word moon using a dictionary or your book.

Label each definition with the correct vocabulary term.

the seventh planet from the Sun; large and gaseous, with a distinct bluish-green color

largest planet and fifth from the Sun; contains more mass than all of the other planets combined

considered to be the ninth planet from the Sun; has a solid icy-rock surface

giant, high-pressure storm in Jupiter’s atmosphere

usually the eighth planet from the Sun; large and gaseous, with rings that vary in thickness

second-largest planet and sixth from the Sun; has a complex ring system and at least 31 moons

Define survey as a verb, using a dictionary. Then use this term in a sentence related to the topic of Section 3.
### Main Idea

**Jupiter**

*Identify the space probes that have explored Jupiter.*

I found this information on page __________.

**Saturn**

*Identify key facts about Saturn.*

I found this information on page __________.

### Details

**Jupiter**

<table>
<thead>
<tr>
<th><strong>Jupiter</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmosphere</td>
</tr>
<tr>
<td>Moons</td>
</tr>
</tbody>
</table>

**Saturn**

<table>
<thead>
<tr>
<th><strong>Saturn</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Probes</td>
</tr>
<tr>
<td>Atmosphere</td>
</tr>
<tr>
<td>Rings</td>
</tr>
<tr>
<td>Moons</td>
</tr>
</tbody>
</table>
Section 3 The Outer Planets (continued)

Main Idea

**Uranus**

*Summarize details about Uranus in the graphic organizer.*

- **Composition**

- **Moons**

- **Rotation**

**Neptune**

*Complete the chart of key facts about Neptune.*

<table>
<thead>
<tr>
<th>Neptune</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmosphere</td>
</tr>
<tr>
<td>Moons</td>
</tr>
</tbody>
</table>

**Pluto**

*Summarize the features that make Pluto unique.*

- 
- 
- 

**Connect It**

Summarize the major features that distinguish the outer planets from the inner planets.

- 
- 
- 

278 The Solar System
The Solar System

Section 4 Other Objects in the Solar System

Scan the title and headings in Section 4. Write a sentence that describes what you think will be covered in the section.

Write a scientific sentence using the term crater.

Define each term using your book or a dictionary.

comet

meteor

meteorite

asteroid

Define approach, using a dictionary. Then locate a sentence in Section 4 that uses the word or a form of the word.

approach
Main Idea

Comets
I found this information on page _______.

Summarize two facts about the Oort Cloud.
1. __________________________________________
2. __________________________________________

Model a comet. Label its nucleus, coma, and tail. Show the solar wind coming from the Sun and where the Sun is in relation to the comet’s tail.

Details

Meteoroids, Meteors, and Meteorites
I found this information on page _______.

Distinguish between meteoroids, meteors, and meteorites. Identify key features of meteoroids, and then contrast meteors and meteorites.

Meteoroids are

Do they burn up in the atmosphere?

Yes

No

They are called ______________. They come from
1. _____________________ 2. _____________________
3. _____________________ 4. _____________________

They are called ______________. Another term for these is ______________.
Section 4  Other Objects in the Solar System (continued)

**Main Idea**

**Asteroids**

I found this information on page __________.

**Details**

Organize information about asteroids. Complete the outline.

Asteroids are _____________________________________________.

A. Location

1. ____________________________________________
2. ____________________________________________

B. What scientists learn from asteroids

1. ____________________________________________
2. ____________________________________________

Model the appearance of the asteroid belt in the solar system. Identify the two planets between which it lies.

**SYNTHESIZE IT**

Compare and contrast comets, meteoroids, and asteroids in a paragraph or a chart.
The Solar System 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 with these.

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

<table>
<thead>
<tr>
<th>The Solar System</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The planets revolve around Earth.</td>
<td></td>
</tr>
<tr>
<td>• The solar system is more than 4.6 billion years old.</td>
<td></td>
</tr>
<tr>
<td>• Mercury has an atmosphere similar to Earth’s.</td>
<td></td>
</tr>
<tr>
<td>• Uranus has craters and deep valleys.</td>
<td></td>
</tr>
<tr>
<td>• Earth is the only planet known to be able to support life.</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

You are planning a new space probe mission to the solar system. Decide on one or more planets, moons, comets, or asteroids that you would like to study. Explain what you expect to see and learn about each object.
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>Stars and Galaxies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern astronomy divides the sky into 88 constellations.</td>
<td></td>
</tr>
<tr>
<td>The Sun is an ordinary star and is the center of our solar system.</td>
<td></td>
</tr>
<tr>
<td>All stars have the same brightness.</td>
<td></td>
</tr>
<tr>
<td>The Milky Way is a part of a cluster called the Local Group, made up of about 45 galaxies.</td>
<td></td>
</tr>
</tbody>
</table>

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

Write a description in your Science Journal of a galaxy.

Name ____________________________ Date ______________

Stars and Galaxies

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.
Predict three topics that will be discussed in Section 1 as you scan the headings and illustrations.

1. 
2. 
3. 

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

**constellation**

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

**absolute magnitude**

**apparent magnitude**

**light-year**

**Use a dictionary to define** component as a noun. Then explain what the statement “breaking it down into its component parts” might mean.

**component**
Main Idea

**Constellations**

*I found this information on page ________.*

Details

**Organize facts about constellations into an outline. Use the structure provided below as a guide.**

I. Constellations

A. ___________________________

B. ___________________________

C. ___________________________

II. Movement of constellations

A. Circumpolar constellations

1. ___________________________

2. ___________________________

B. Other constellations

1. ___________________________

2. ___________________________

**Complete the diagram to show how each type of magnitude is related to a star’s distance.**

**Effect of Distance on Magnitude**

- Absolute magnitude ___________

- Apparent magnitude ___________

**Stars and Galaxies** 285
**Main Idea**

**Measurement in Space**

*I found this information on page ________.*

**Details**

*Analyze the diagram below that shows how parallax occurs as Earth moves in its orbit.*

![Diagram showing parallax](image)

Name ___________________________ Date ___________________________

**Properties of Stars**

*I found this information on page ________.*

**Summarize how astronomers use parallax.**

* ________

* ________

* ________

**Sequence the colors of stars by temperature. Complete the diagram by writing the correct color in each box.**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Cooler</th>
<th>Medium</th>
<th>Hotter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Star Color</td>
<td>______</td>
<td>______</td>
<td>______</td>
</tr>
</tbody>
</table>

**SYNTHESIZE IT**

A hot, blue-white star has brighter absolute magnitude than a cooler, red star. The red star appears brighter from Earth. What can you conclude about the two stars?

* ________

* ________

* ________
Skim through Section 2 of your book. Write three questions that come to mind from reading the headings and examining the illustrations.

1. 
2. 
3. 

Define cycle to show its scientific meaning.

cycle

Write a sentence from your book in which each term appears.

photosphere

chromosphere

corona

sunspots

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

Use nuclear in an original sentence.

nuclear
Main Idea

The Sun’s Layers

I found this information on page __________.

Details

Summarize basic information about the Sun. Complete the graphic organizer.

Model the Sun, including the following features. Include captions summarizing each feature.

- chromosphere
- convection zone
- core
- corona
- photosphere
- radiation zone

The Sun’s Atmosphere

I found this information on page __________.
Organize information about the Sun’s surface features.

Sunspots: ____________________________

Prominences: __________________________

Flares: ____________________________

Coronal mass ejection (CME): ____________________________

Compare and contrast the Sun with other stars. Complete the paragraph below.

Compared with other stars, the Sun’s ________, ________, ________, and ________ are about average. In contrast with other stars, the Sun ____________________________

and ____________________________.

CONNECT IT

Choose one characteristic you have learned about the Sun, such as its size, structure, or distance from Earth. Suppose that the characteristic was different. Predict how this would affect life on Earth.
Stars and Galaxies
Section 3 Evolution of Stars

Scan the headings of Section 3 to find three stages of the evolution of stars.
1. 2. 3.

Define gravity. Use the term in a sentence to show its scientific meaning.

gravity

Define the following terms. Write a sentence to show each term’s scientific meaning.

nebula

white dwarf

neutron star

Define enormous using a dictionary.
enormous
Section 3  Evolution of Stars (continued)

Main Idea

Classifying Stars

Classify stars using the H-R diagram. Label the diagram below to show where you would expect to find white dwarfs, the main sequence, supergiants, giants, and the Sun.

How do stars shine?

Summarize how stars generate energy.

Details

Temperature (K)

Spectra Class

O   B   A   F   G   K   M

Increasing brightness
Sequence the evolution of stars. Complete the flow chart.

Stars with mass 8 times the Sun’s mass or less
- contracts and fusion begins
- hydrogen fuel runs out
- outer layers escape, leaving core
- core mass between 1.4 and 3 times the mass of the Sun

Stars with mass more than 8 times the Sun’s mass
- contracts and fusion begins
- hydrogen fuel runs out; heavy elements form
- iron forms in core; core collapses violently
- core mass more than 3 times the mass of the Sun

Connect It
Evaluate why supernovas are important to the existence of life on Earth.
Preview Section 4 of your book using the list below.

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

Write two facts that you discovered during your preview.
1. 
2. 

Define universe to reflect its scientific meaning.

Define the following key terms. Then write sentences to show the scientific meaning of each term.

- galaxy

Define normal. Write a sentence to show its scientific meaning.
Main Idea

Galaxies

I found this information on page __________.

The Milky Way

I found this information on page __________.

Classify the three major types of galaxies. Complete the chart.

<table>
<thead>
<tr>
<th>Galaxy Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spiral arms that wind outward from the center</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not look like the other two types of galaxies; many possible shapes</td>
<td></td>
</tr>
</tbody>
</table>

Model the Milky Way galaxy.

- Draw a side view and overhead view of the Milky Way.
- Mark the Sun’s position on both views.
- Label the size of the Milky Way and the distance from the center to the Sun’s position on the overhead view.

Identify three other facts about the Milky Way.

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
Section 4 Galaxies and the Universe (continued)

Main Idea

**Origin of the Universe**

I found this information on page __________.

**Expansion of the Universe**

I found this information on page __________.

**The Big Bang Theory**

I found this information on page __________.

Details

**Contrast** two models of the origin of the universe: the steady state theory and the oscillating model.

Steady state theory: ____________________________________________________________________

Oscillating model: ____________________________________________________________________

**Analyze** how scientists used the Doppler shift to reach a conclusion about whether the universe is expanding or contracting.

<table>
<thead>
<tr>
<th>Observation</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summarize** the big bang theory of the origin of the universe.

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

**Summarize It**

Describe your location in the universe as completely as you can.

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
Stars and Galaxies  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 with 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>Stars and Galaxies</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Modern astronomy divides the sky into 88 constellations.</td>
<td></td>
</tr>
<tr>
<td>• The Sun is an ordinary star and is the center of our solar system.</td>
<td></td>
</tr>
<tr>
<td>• All stars have the same brightness.</td>
<td></td>
</tr>
<tr>
<td>• The Milky Way is a part of a cluster called the Local Group, made up of about 45 galaxies.</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 stars and galaxies.

---

296  *Stars and Galaxies*
Academic Vocabulary

accompany: to go together with; to happen at the same time as
accumulate: to gather, pile up, or collect
accurate: careful and exact; without mistakes or errors
affect: to influence
approach: to come near
area: particular space, region, or section
chemical: any substance used in or obtained by a chemical process
collapse: to fall or shrink together abruptly and completely
compensate: to make up for
component: part of a machine or system
consist: to be made up of; to contain
constant: not changing; remaining the same; remaining free of variation; regular; stable
contract: to make or become shorter or smaller
controversy: argument or debate
convert: to change from one form to another form
core: center; a central part of something
create: to bring about
cycle: series of actions that repeat
derive: to get or receive from a source
detect: to discover something hidden or not easily noticed
diverse: not all the same, varied
emerge: to come out; to appear
enormous: having great size
environment: the physical, chemical, and biotic factors that surround living things
erode: to wear away
eventual: ultimately resulting
exceed: to go beyond or be greater than
expose: to leave open or without protection; to reveal
extract: to take, get, or pull out
formula: a group of symbols and figures showing the elements in a chemical compound
goal: objective or end that one strives to achieve
hypothesis: a reasonable guess that can be tested and is based on what is known and what is observed
impact: a strong effect
indicate: to be or give a sign of
infer: to arrive at a conclusion or an opinion by reasoning
interval: space or time between events
layer: one thickness over another
likewise: in the same way
locate: to find the position or site of
maintain: to continue; to support
normal: conforming to a type; standard or regular pattern
nuclear: of or relating to the atomic nucleus


**Academic Vocabulary**

**objective:** open and fair; without bias

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

**obvious:** easy to see or understand; clear

**occur:** to happen or take place

**outcome:** end result of a particular situation or experiment

**parallel:** being the same distance apart at all points

**phenomenon:** any fact, condition, or happening that can be observed and described in a scientific way

**physical:** having to do with things we experience through our senses

**predict:** to tell what one thinks will happen in the future

**process:** series of changes by which something develops

**range:** the difference between the highest and lowest values

**ratio:** relation of one thing to another in size or amount

**recover:** to get back something that has been lost

**release:** to set free or let go

**reveal:** to make known; to show or display

**reverse:** to go in the opposite direction

**rigid:** not bending or moving; stiff and hard

**role:** part played by a person or thing

**sequence:** one thing following another in a fixed order

**stress:** a force exerted when one body presses on, pulls on, pushes against, or tends to compress or twist another body

**structure:** anything that is built; a home or other building or a molecule’s structure

**sum:** the number that results when two or more numbers are added

**survey:** to look at or study in detail

**survive:** to continue to exist; to live through

**technology:** use of science for practical purposes, especially in engineering and industry

**trace:** a very small amount

**transfer:** to move, carry, send, or change from one person or place to another

**transform:** to change the nature or condition of something

**transport:** to carry from one place to another

**undergo:** to go through; to endure

**underlie:** to lie beneath

**vary:** to change; to make different

**visible:** able to be seen; perceptible with the eye

**volume:** the amount of space taken up by an object or substance