About the Consultant

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Note-Taking Tips

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

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

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

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

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

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

• Ask questions and participate in class discussion.

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

Note-Taking Don’ts

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

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

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

• Don’t lose focus or you will become lost in your note-taking.
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.

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

**Organizing Ecosystems**

1. 
2. 
3. 
4. 

**Living Parts of Ecosystems**

1. 
2. 
3. 
4. 

**Key Needs of Organisms**

<table>
<thead>
<tr>
<th>1. Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Shelter</td>
</tr>
<tr>
<td>3. Protection</td>
</tr>
<tr>
<td>4. Reproduction</td>
</tr>
</tbody>
</table>

---

**Chapter Wrap-Up**

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

**Review Checklist**

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

**Graphic Organizers**

A variety of visual organizers help you to analyze and summarize information and remember content.
Before You Read

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 and Inquiry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Science and technology are independent of one another.</td>
</tr>
<tr>
<td></td>
<td>• Only scientists use science skills.</td>
</tr>
<tr>
<td></td>
<td>• Scientific theories can change if new information becomes available.</td>
</tr>
<tr>
<td></td>
<td>• Science experiments that are done by professional scientists do not need to be repeated.</td>
</tr>
</tbody>
</table>

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

Write down three examples of how science affects your everyday life.
Skim through Section 1 of your text. Write three questions that come to mind from reading the headings and looking at the illustrations.

1. ____________________________________________
   ____________________________________________

2. ____________________________________________
   ____________________________________________

3. ____________________________________________
   ____________________________________________

Define theory. Write a sentence about a theory you have heard people talk about in everyday life.

theory

__________________________________________________________

__________________________________________________________

Write the correct key term from your text next to each definition.

an explanation of a pattern observed repeatedly in the natural world

__________________________________________________________

a way of learning more about the natural world

__________________________________________________________

a collection of structures, cycles, and processes that relate to and interact with each other

__________________________________________________________

a rule that describes a pattern in nature

__________________________________________________________

Use a dictionary to help you write a scientific definition of the word cycle.

cycle

__________________________________________________________

__________________________________________________________
Section 1 What is science? (continued)

**Main Idea**

Learning About the World  
*I found this information on page ____________.*

**Details**

**Complete** the graphic organizer to show what may happen to a scientific theory when new data are discovered. Use the following phrases:

- Evaluate scientific theory.  
- Theory is modified.  
- Theory is discarded.  
- Theory stays the same.

![Graphic Organizer](image)

Synthesize information from your book to list some of the structures, cycles, and processes in your school day.

<table>
<thead>
<tr>
<th>Structures</th>
<th>Cycles</th>
<th>Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Choose at least one structure, one cycle, and one process from your list and describe the ways they interact.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Classify which branch of science—physical science, Earth science, or life science—includes each of the following examples. Then, write one additional example studied by that science.

<table>
<thead>
<tr>
<th>Example</th>
<th>Branch of Science</th>
<th>Additional Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meteors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical reactions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clouds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complete the following sentences about the relationship between science and technology.

____________________ is a way to learn about the natural world.

To use these answers for helping people, however, they must be applied in some way. __________________ is the practical use of __________________ in our everyday lives.

Write about a time when you used science to figure out a problem in your everyday life. Include an additional question about this topic that you might like to investigate.
The Nature of Science and Inquiry

Section 2 Science in Action

Benchmarks—SC.H.1.3.1: The student knows that scientific knowledge is subject to modification . . .
Also covers: SC.H.1.3.3, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.6, SC.H.2.3.1, SC.H.3.3.3

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

1. 
2. 
3. 

Review Vocabulary Define observation and give an example of an observation you made today.
observation

New Vocabulary Define the following key terms.
hypothesis

infer

controlled experiment

variable

constant

Academic Vocabulary Define chart to show its scientific meaning.
chart
**Main Idea**

**Scientific Inquiry Skills**

Sequence the steps of scientific inquiry. Complete the flow chart.

[Diagram of flow chart with steps: Observe, question, collect information → Analyze → Hypothesis supported? → Yes → (Further steps not shown) → No → (Further steps not shown)]

**Summarize** how scientists draw conclusions and communicate those conclusions.

I. Drawing conclusions
   A. ____________________________
   B. ____________________________

II. Communicating conclusions
   A. What to communicate
      1. ____________________________
      2. ____________________________
   B. How to communicate
      1. ____________________________
      2. ____________________________

Section 2 Science in Action (continued)
Compare and contrast types of variables and constants.

The ___________ is changed in an experiment. The ___________ changes because of a change in the ___________. The ___________ must stay the same.

Change the safety habits below to the correct wording. Use your book for help.

1. Find and follow some safety symbols.

2. Point test tubes towards yourself but not your lab partner.

3. Only reach into holes or under rocks if your teacher is nearby.

Organize information about research ethics. Complete the graphic organizer by giving examples of ethical rules that apply to each area.

Research Ethics

Human Subjects

Animal Subjects

Community Health

Think of a scientific question that you would like to answer. Then, write three hypotheses, or possible answers, to your question. How could you test your hypotheses?
The Nature of Science and Inquiry

Section 3 Models in Science

**Scan** Section 3 of your book. Then write three questions that you have about the use of models in science. Try to answer your questions as you read.

1. __________________________
2. __________________________
3. __________________________

**Define** scientific method. *Then give an example of the scientific method in action.*

scientific method

______________________________
______________________________
______________________________

**Define** model. *Then give some examples of real-life and scientific models.*

model

______________________________
______________________________
______________________________

**Define** encounter. *Then use the term in an original sentence that shows its scientific meaning.*

encounter

______________________________
______________________________
______________________________
Section 3 Models in Science (continued)

Main Idea

Why are models necessary?
I found this information on page 1.

Types of Models
I found this information on page 2.

Making Models
I found this information on page 3.

Details

Summarize in a short paragraph how models are helpful.

Organize information in the table to describe the three types of models and their uses.

<table>
<thead>
<tr>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Physical</td>
</tr>
</tbody>
</table>

Create a diagram of the building in which you live. Provide as much detail as possible so that your model will be accurate. Identify uses for this model.
Complete the graphic organizer about three ways that models are useful and three examples of scientific models.

Use:  
Models:  
Examples:  

Identify two reasons that models have limitations and list an example of a model for each reason.

1. ________________________________
   ________________________________
   ________________________________

2. ________________________________
   ________________________________
   ________________________________

As more has been learned about the solar system, the models used to represent it have changed. What are some other models that might have changed over time as new discoveries were made?
Skim through the section. Read the headings and look at the illustrations. Then write three questions that come to mind. Add to these impressions as you read the section.

1. 

2. 

3. 

Define the word prediction. Write a sentence to give an example of a prediction to show its scientific meaning.

prediction

Define the following key terms.

critical thinking

data

Use evaluate in a sentence to show its scientific meaning.

evaluate
Complete the following sentences using these terms.

- sense
- inferences
- evaluate
- observations
- conclusions
- accurate
- critical

You can ____________ an explanation using ____________ thinking. First, you should examine the ____________ and decide if you believe they are ____________. Then, look at the ____________ or ____________ made about the data and decide if they make ____________.

Summarize three features of reliable data.

1. _____________________________________________________________________
2. _____________________________________________________________________
3. _____________________________________________________________________

Organize three characteristics of good notes.

Good notes are _____________________________________________________________________
Section 4 Evaluating Scientific Explanation (continued)

Main Idea

Evaluating the Conclusions

I found this information on page __________.

Details

Complete the concept web to show the steps you might use when evaluating a scientific explanation. Use the phrases:

- Are there good notes?
- Could there be another explanation?
- Can the data be repeated?
- Evaluate the conclusion.
- Does it make sense based on what I know?

Evaluate the data.

Are the data specific?

Are the data reliable?

Scientific Explanation

CONNECT IT

Create your own advertisement for a wrinkle cream. Include claims about the product’s safety and effectiveness, and use information that might help support those claims. List reasons why another person should or should not believe your ad.

Advertisement: __________________________________________

____________________________________________________________________

____________________________________________________________________

Reasons: ____________________________________________________________

____________________________________________________________________

The Nature of Science and Inquiry  13
The Nature of Science and Inquiry

Chapter Wrap-Up

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

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

<table>
<thead>
<tr>
<th>The Nature of Science and Inquiry</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Science and technology are independent of one another.</td>
<td></td>
</tr>
<tr>
<td>• Only scientists use science skills.</td>
<td></td>
</tr>
<tr>
<td>• Scientific theories can change if new information becomes available.</td>
<td></td>
</tr>
<tr>
<td>• Science experiments that are done by professional scientists do not need to be repeated.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

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

SUMMARIZE IT

After reading this chapter, identify three things you have learned about the nature of scientific inquiry.

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

Science Journal

Use descriptive adjectives to describe mountains in a short paragraph.
Forces Shaping Earth
Section 1 Earth’s Moving Plates

Scan the section before you begin to read. Write three facts that you discovered about Earth’s moving plates.

1. 
2. 
3. 

Define the word density using your book or a dictionary.

density

Write the vocabulary term that matches each definition.

solid, innermost layer of Earth’s interior
layer of Earth that lies above the inner core and is thought to be made up mostly of molten metal
largest layer of Earth’s interior
Earth’s outermost layer
rigid layer of Earth made of the crust and a part of the upper mantle
section of Earth’s crust and rigid upper mantle
large fracture in rock along which movement occurs
type of plate movement that occurs when one plate sinks beneath another plate
shaking of the ground caused by a sudden release of energy in Earth’s crust

Use contract in a sentence to reflect its scientific meaning.

contract

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.
Complete the graphic organizer to explain how scientists use indirect observations to learn about Earth’s interior.

I found this information on page __________.

Organize information about Earth’s layers. Complete the outline.

Earth’s Layers

A. Inner core
   1. ____________________________
   2. ____________________________

B. Outer core
   1. ____________________________
   2. ____________________________

C. Mantle
   1. ____________________________
   2. ____________________________

D. Crust
   1. ____________________________
   2. ____________________________

Analyze Earth’s plates. Fill in the missing words.

Earth’s plates are sections of the ___________. They move on top of the ___________, which is ___________.

Forces Shaping Earth 17
Main Idea

Plate Boundaries
I found this information on page __________.

Details

**Summarize** the different ways that plates interact at plate boundaries. Provide an example of each location.

<table>
<thead>
<tr>
<th>Plate Interaction</th>
<th>Results</th>
<th>Location Where Occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plates move apart.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continental plates collide.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One plate sinks beneath another plate.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plates slide past one another.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Distinguish** three possible causes of plate motion.

1. __________________________
2. __________________________
3. __________________________

**CONNECT IT**

Compare Earth's plates to a jigsaw puzzle. How are they similar?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Forces Shaping Earth
Section 2 Uplift of Earth’s Crust

Benchmarks—SC.D.1.3.3: The student knows how conditions that exist in one system influence the conditions that exist in other systems. Also covers: SC.D.1.3.5, SC.H.1.3.5, SC.H.2.3.1

Scan Section 2. Then write three questions that occur to you.

1. ____________________________________________________________
2. ____________________________________________________________
3. ____________________________________________________________

Review Vocabulary

Define erosion using your book or a dictionary.

erosion

New Vocabulary

Write a sentence that reflects the scientific meaning for each vocabulary term.

fault-block mountain

folded mountain

upwarped mountain

volcano

isostasy

Academic Vocabulary

Write a two-line poem using the term erode.

erode
Main Idea

Building Mountains

I found this information on page __________.

Details

Identify the four main types of mountains.

1. ________________  
2. ________________  
3. ________________  
4. ________________

Contrast mountains that are still forming with older mountains.

Mountains that are still forming are __________ and __________.

Older mountains have ____________________________.

Organize information from your book about fault-block, folded, and upwarped mountains.

Fault-block

Example:

how it forms

where it forms

Folded

Example:

how it forms

where it forms

Upwarped

Example:

how it forms

where it forms

interior of continent

Section 2 Uplift of Earth’s Crust (continued)
Main Idea

Building Mountains

Create a cross-section drawing of a volcanic mountain formed on land. Show the magma, magma chamber, pipe, vent, and crater as the magma flows from underground out of the crater.

Other Types of Uplift

Sequence how gravity affects uplifted crust. Complete the flow chart.

Mountains grow larger.

CONNECT IT

Use what you have learned about isostasy to compare the crust under the Appalachian Mountains today with the crust when the mountains formed.
Forces Shaping Earth  Chapter Wrap-Up

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

<table>
<thead>
<tr>
<th>K</th>
<th>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>

After reading this chapter, identify three things that you have learned about forces that shape Earth.

[ ] 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 forces that shape Earth.
Weathering and Erosion

Weathering and Erosion

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 Erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Weathering is the conditions of the atmosphere at a given time.</td>
</tr>
<tr>
<td></td>
<td>• Soil forms from pieces of broken rock and other kinds of matter.</td>
</tr>
<tr>
<td></td>
<td>• Erosion moves rock and soil from one place to another.</td>
</tr>
<tr>
<td></td>
<td>• Water can cause erosion, but ice cannot.</td>
</tr>
</tbody>
</table>

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

Science Journal

Describe a place—a home, a park, a river, or a mountain. What might that place look like in a year, a hundred years, even 5,000 years?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
Weathering and Erosion
Section 1 Weathering and Soil Formation

Benchmarks—SC.D.1.3.1: knows that mechanical and chemical activities shape and reshape the Earth's land surface . . . Also covers: SC.D.1.3.2, SC.D.1.3.3, SC.D.1.3.4, SC.H.1.3.5, SC.H.1.3.7, SC.H.2.3.1

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

1. 
2. 
3. 

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

*acid rain*

*weathering*

*mechanical weathering*

*chemical weathering*

*soil*

*topography*

**Define** process. Use a dictionary to help you.

*process*
Main Idea

Weathering

Organize information by listing three things that cause rocks to weather.

<table>
<thead>
<tr>
<th>Causes of Weathering</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

Details

Mechanical Weathering

Identify major causes of mechanical weathering. Complete the concept map below.

Create three drawings to show the process of ice wedging.

- Water seeps into cracks.
- Water freezes and expands, making cracks wider.
- Ice melts and the process repeats.
Organize the information on chemical weathering in the outline below.

Chemical weathering
A. Definition: ________________________________________________
   ________________________________________________

B. Causes:
   1. ________________________________________________________
   2. ________________________________________________________
   3. ________________________________________________________

Complete the graphic organizers about soil and soil formation.

The temperature on some mountains is below freezing all year. Predict what soil on these mountains is like.

Name __________________________ Date ____________

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Weathering and Erosion

Section 2 Erosion of Earth’s Surface

Scan Use the checklist below to preview Section 2 of your book.
Then write three facts that you discovered about how erosion affects Earth’s surface.

☐ Read all headings.
☐ Read all boldface words.
☐ Look at all of the pictures.
☐ Think about what you already know about features of Earth’s surface.

1. ___________________________________________
2. ___________________________________________
3. ___________________________________________

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

- the dropping of sediment that occurs when an agent of erosion can no longer carry its load

New Vocabulary

- the movement of rock or soil by gravity, ice, wind, or water
- erosion that occurs when gravity alone causes rock or sediment to move down a slope
- the process in which sediment moves slowly downhill
- the movement of rock or sediment downhill along a curved surface
- the erosion of the land by wind
- erosion that occurs when wind blows sediment into rocks, makes pits in the rocks, and produces a smooth, polished surface
- water that flows over the ground

Academic Vocabulary
Use a dictionary to define occur.

occur
Section 2 Erosion of Earth’s Surface (continued)

Main Idea

Agents of Erosion

I found this information on page __________.

Gravity

I found this information on page __________.

Ice

I found this information on page __________.

Details

Organize information on the 4 agents of erosion by filling in the concept map.

Gravity

Ice

Compare and contrast the four types of mass movements. Write ways they are all the same and some ways they are different.

Mass Movements

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Similarities</td>
<td>Differences</td>
</tr>
</tbody>
</table>

Sequence four steps explaining how glaciers form and change Earth’s surface.

Glaciers Form and Change Earth’s Surface

1.

2.

3.

4.
Section 2 Erosion of Earth’s Surface (continued)

Main Idea

Wind

Model how a sand dune moves by making a diagram in the box. Label the following features:

• sand blows up this side
• sand falls down this side
• dune movement (arrow)
• wind (arrow)

Complete the concept map by listing several ways that water can flow over Earth’s surface.

Runoff

Effects of Erosion

Analyze the effects of erosion. List three examples of landforms caused by erosion, and three examples caused by deposition.

<table>
<thead>
<tr>
<th>Effects of Erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where Sediment Is Removed (erosion)</td>
</tr>
</tbody>
</table>

I found this information on page _______.

Water

I found this information on page _______.

Effects of Erosion

I found this information on page _______.

Model how a sand dune moves by making a diagram in the box. Label the following features:

• sand blows up this side
• sand falls down this side
• dune movement (arrow)
• wind (arrow)

Complete the concept map by listing several ways that water can flow over Earth’s surface.

Runoff

Analyze the effects of erosion. List three examples of landforms caused by erosion, and three examples caused by deposition.

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<thead>
<tr>
<th>Effects of Erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where Sediment Is Removed (erosion)</td>
</tr>
</tbody>
</table>

I found this information on page _______.

I found this information on page _______.

I found this information on page _______.

Weathering and Erosion 29
Weathering and Erosion
Chapter Wrap-Up

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

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

<table>
<thead>
<tr>
<th>Weathering and Erosion</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Weathering is the conditions of the atmosphere at a given time.</td>
<td></td>
</tr>
<tr>
<td>• Soil forms from pieces of broken rock and other kinds of matter.</td>
<td></td>
</tr>
<tr>
<td>• Erosion moves rock and soil from one place to another.</td>
<td></td>
</tr>
<tr>
<td>• Water can cause erosion, but ice cannot.</td>
<td></td>
</tr>
</tbody>
</table>

Review
Use this checklist to help you study.

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

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

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
The Periodic Table

Before You Read

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

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

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

Think of an element you have heard about. Make a list of the properties you know and the properties you want to learn about.

---

Sunshine State Standards—SC.H.2.: The student understands that most natural events occur in comprehensible, consistent patterns. Also covers: SC.A.1
The Periodic Table
Section 1 Introduction to the Periodic Table

Benchmarks—SC.H.2.3.1: The student recognizes that patterns exist within and across systems.
Also covers: SC.A.1.3.1, SC.A.1.3.5, SC.H.1.3.6, SC.H.3.3.5

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

1. __________________________________________________________________________
2. __________________________________________________________________________
3. __________________________________________________________________________

Use element in a sentence to show its scientific meaning.

- __________________________________________________________________________
- __________________________________________________________________________

Write the correct vocabulary term next to its definition.

- column of elements in the periodic table that have similar physical or chemical properties
- element that shares some properties with metals and some with nonmetals
- element in Groups 1, 2, or 13–18
- element that has a shiny luster, is a good conductor of heat and electricity, is malleable, and is ductile
- element in Groups 3–12
- element that is usually a gas or brittle solid at room temperature and does not conduct heat and electricity well
- row of elements in the periodic table whose properties change gradually

Define symbol using a dictionary to show its scientific meaning.

- __________________________________________________________________________
- __________________________________________________________________________
Main Idea

Development of the Periodic Table

I found this information on page _________.

Details

Organize information about the development of the periodic table. Complete the outline.

History of the Periodic Table

I. Mendeleev’s contributions

A. __________________________________________

B. __________________________________________

C. __________________________________________

II. Moseley’s contributions

A. __________________________________________

B. __________________________________________

Distinguish a period from a group by completing the sentences.

A period is ________________________________
________________________________________.

A group is ________________________________
________________________________________.

Create a drawing of an empty periodic table. Shade the representative elements one color, the transition elements another, and the inner transition elements a third color.
Suppose you discovered a new element. How would you predict where it would fit in the periodic table if you did not know its atomic number?

Contrast metals, nonmetals, and metalloids in the table.

<table>
<thead>
<tr>
<th>Metals</th>
<th>Nonmetals</th>
<th>Metalloids</th>
</tr>
</thead>
</table>

Label the square below with the information you would find about hydrogen in its element key. Fill in the missing information.

Summarize how names and symbols for elements are chosen. Include both existing and newly discovered elements.

CONNECT IT
The Periodic Table
Section 2 Representative Elements

Benchmarks—SC.A.1.3.1: The student identifies various ways in which substances differ (e.g., mass, volume, shape, density, texture, and reaction to temperature and light). Also covers: SC.A.1.3.5, SC.G.1.3.4

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

1. ______________________________________
2. ______________________________________
3. ______________________________________

Define atomic number.

atomic number

______________________________

New Vocabulary

Use your book to define each vocabulary term.

alkali metal

______________________________

alkaline earth metal

______________________________

semiconductor

______________________________

halogen

______________________________

noble gas

______________________________

Academic Vocabulary

Use a dictionary to define trend.

trend

______________________________
**Main Idea**

**Groups 1 and 2**

I found this information on page __________.

**Details**

**Summarize** the properties of the alkali metals.

- **Density**
- **Color and State**
- **Melting Point**
- **Reactivity**

**Compare and contrast** the alkaline earth metals and the alkali metals. Describe the hardness, density, melting points, and reactivity of elements in the two groups.

I found this information on page __________.

**Groups 13 through 18**

I found this information on page __________.

**Summarize** information about elements in the boron family by filling in the missing words in the paragraph below.

All the elements in group 13 are __________ except __________, which is a metalloid. The elements in this family are used to make many different things. Pots and pans made with __________ can move straight from the refrigerator to the oven without cracking. __________ is used to make soft drink cans. __________, which will melt in your hands, is used to make computer chips.
Section 2  Representative Elements (continued)

**Main Idea**

Choose any three elements from this section and explain how they are important to your daily life.

**Details**

Compare the elements in the carbon group.

<table>
<thead>
<tr>
<th>Metal, Non-metal, or Metalloid?</th>
<th>Where it is Found or How it is Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>nonmetal</td>
</tr>
<tr>
<td>Silicon</td>
<td>metalloid</td>
</tr>
<tr>
<td>Germanium</td>
<td>metalloid</td>
</tr>
<tr>
<td>Tin</td>
<td>metal</td>
</tr>
<tr>
<td>Lead</td>
<td>metal</td>
</tr>
</tbody>
</table>

Complete the outline to identify important points about certain elements in Groups 15 and 16.

I. Group 15

A. __________: makes up about 80% of the air you breathe

B. Phosphorus: ________________________________

II. Group 16

A. Oxygen: ________________________________

B. __________: combines with hydrogen and oxygen to make sulfuric acid, one of the most commonly used chemicals

C. Selenium: ________________________________

Identify at least one important fact about each group of elements.

Halogens: ________________________________

Noble gases: ________________________________

**Connect It**

Choose any three elements from this section and explain how they are important to your daily life.

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________
The Periodic Table
Section 3 Transition Elements

Scan the headings and illustrations in this section. Write three facts you learned about transition elements as you scanned the section.

1. 
2. 
3. 

Review Vocabulary

mass number

Use mass number in a scientific sentence.

New Vocabulary

catalyst

Define each vocabulary term using a dictionary or your book.

lanthanide

actinide

Academic Vocabulary

series

Use a dictionary to define series to show its scientific meaning.
Section 3 Transition Elements (continued)

Main Idea

The Metals in the Middle

I found this information on page __________.

Details

Identify four key characteristics of the transition elements including their location in the periodic table.

1. __________________________
   __________________________

2. __________________________
   __________________________

3. __________________________
   __________________________

4. __________________________
   __________________________

Summarize the properties of the iron triad.

Iron Triad

What these elements have in common: __________________________

| Element: _____ | Uses:       |
| Element: _____ | Uses:       |
| Element: _____ | Uses:       |

Identify uses of transition elements.

<table>
<thead>
<tr>
<th>Element(s)</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tungsten</td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td></td>
</tr>
<tr>
<td>Elements in the platinum group</td>
<td></td>
</tr>
</tbody>
</table>
### Main Idea

**Inner Transition Elements**

*I found this information on page ________.*

### Details

**Compare and contrast the lanthanides and actinides.**

<table>
<thead>
<tr>
<th></th>
<th>Lanthanides</th>
<th>Actinides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summarize how scientists create synthetic elements.**

Using a particle accelerator scientists make ___________________________. The nuclei _______________ to form ___________________________. Some of these elements are _______________ and last only _______________.

**Identify two ways dentists and orthodontists use transition elements.**

1. ___________________________
2. ___________________________

**CONNECT IT**

Hypothesize why a scientist should be extra careful when using a mercury thermometer.

|                      |             |           |
Tie It Together

The Periodic Table

Create a periodic table puzzle.

1. Obtain six pieces of paper. Cut each piece of paper into six equal pieces.
2. Make an element box for each of the first 36 elements in the periodic table. On each element box, fill in only part of the information shown on the periodic table.
3. Swap your set of partially complete element boxes with a partner.
4. Complete each element box in your partner’s set.
5. Then, piece together your partner’s periodic table in order.
After reading this chapter, identify three things you have learned about elements and the periodic table.

**KW L**

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

**Review**

*Use this checklist to help you study.*

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

**SUMMARIZE IT**

After reading this chapter, identify three things you have learned about elements and the periodic table.

---

42 *The Periodic Table*
Atomic Structure and Chemical Bonds

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>Atomic Structure and Chemical Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Electrons exist with specific levels of energy.</td>
</tr>
<tr>
<td></td>
<td>• Elements can be arranged according to their properties.</td>
</tr>
<tr>
<td></td>
<td>• An atom that loses an electron is called a molecule.</td>
</tr>
<tr>
<td></td>
<td>• Elements can form bonds by sharing electrons.</td>
</tr>
</tbody>
</table>

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

Science Journal

Write a sentence comparing household glue to chemical bonds.
Atomic Structure and Chemical Bonds

Section 1 Why do atoms combine?

Benchmarks—SC.A.2.3.2: The student knows the general properties of the atom (a massive nucleus of neutral neutrons and positive protons surrounded by a cloud of negative electrons) and accepts that single atoms are not visible. Also covers: SC.A.1.3.5, SC.H.1.3.6, SC.H.2.3.1, SC.H.3.3.5

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

1. 
2. 
3. 

**Define** chemical change *to show its scientific meaning.*

<table>
<thead>
<tr>
<th>chemical change</th>
</tr>
</thead>
<tbody>
<tr>
<td>the area around the nucleus where electrons are most likely found</td>
</tr>
</tbody>
</table>

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

| the area around the nucleus where electrons are most likely found |
| the different areas for an electron in an atom |
| uses the symbol for an element and dots representing the number of electrons in its outer energy level |
| force that holds two atoms together |

**Use a dictionary to define period. Then tell how the word is used in the context of the periodic table.**

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

44 Atomic Structure and Chemical Bonds
Section 1 Why do atoms combine? (continued)

Main Idea

Atomic Structure
I found this information on page ___________.

Model the structure of an atom that has 3 protons, 4 neutrons, and 3 electrons. Label the protons, neutrons, electrons, and nucleus in your drawing.

Electron Arrangement
I found this information on page ___________.

Complete the chart to show the maximum number of electrons that can exist in each energy level of an atom.

<table>
<thead>
<tr>
<th>Energy Level</th>
<th>Maximum Number of Electrons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Write the formula for calculating the maximum number of electrons that can occupy an energy level.

Formula for calculating electrons per energy level: ___________

Periodic Table and Energy Levels
I found this information on page ___________.

Analyze the relationship of the atomic number of a neutral atom to the number of electrons and protons it contains.

__________________________________________

__________________________________________

__________________________________________
Hydrogen gas is lighter than helium gas. Hypothesize why airships use helium for buoyancy instead of hydrogen.
Predict three things that might be discussed in this section after reading the headings that appear in it.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Use compound in a sentence to show its scientific meaning.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Write the correct vocabulary term next to its definition.

__________________________________________
chemical shorthand that uses symbols to tell what elements are in a compound and their ratios

__________________________________________
chemical bond that forms between atoms when they share electrons

__________________________________________
atom that is no longer neutral because it has more or fewer electrons than protons

__________________________________________
bond in which electrons are shared unequally

__________________________________________
chemical bond formed when metal atoms share their pooled electrons

__________________________________________
attraction between oppositely charged ions

__________________________________________
neutral particle formed when atoms share electrons

Define achieve to show its scientific meaning.

________________________________________________________________________
Main Idea

Ionic Bonds—Loss and Gain
I found this information on page _________.

Details

Complete the electron dot diagram below to show the final compound.

\[
\text{Na} + \text{Cl} \rightarrow \left[ \text{Na}^+ \right] \left[ \text{Cl}^- \right]
\]

Summarize what is occurring in the diagram. Your description should include the words ion, negative, positive, and compound.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Compare and contrast metallic bonds with ionic bonds by completing the Venn diagram with at least five facts.

I found this information on page _________.

Describe two characteristics of metals that are caused by metallic bonding.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Section 2 How Elements Bond (continued)

Main Idea

Covalent Bonds—Sharing
I found this information on page __________.

Polar and Nonpolar Molecules
I found this information on page __________.

Chemical Shorthand
I found this information on page __________.

Details

Organize information about covalent bonds.
I. Covalent Bond
   A. Definition: ________________________________
   __________________________________________
   B. How atoms share electrons
      1. ______________________________________
      2. ______________________________________
   C. Multiple bonds: __________________________
      _________________________________________

Model a polar molecule. Label the ends as positive or negative.

Label the parts of the chemical formula shown. Then summarize what the formula tells you about the compound.

CONNECT IT

Chlorine is a gas with a distinct odor. Do you think that someone with an acute sense of smell would be able to smell chlorine in table salt? Explain.
Atomic Structure and Chemical Bonds Chapter Wrap-Up

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

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

<table>
<thead>
<tr>
<th>Atomic Structure and Chemical Bonds</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Electrons exist with specific levels of energy.</td>
<td></td>
</tr>
<tr>
<td>• Elements can be arranged according to their properties.</td>
<td></td>
</tr>
<tr>
<td>• An atom that loses an electron is called a molecule.</td>
<td></td>
</tr>
<tr>
<td>• Elements can form bonds by sharing electrons.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

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

SUMMARIZE IT

After reading this chapter, identify three things you have learned about how chemicals bond.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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>States of Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>• There are four states of matter.</td>
<td></td>
</tr>
<tr>
<td>• Solids take the shape of their containers.</td>
<td></td>
</tr>
<tr>
<td>• Substances cannot change directly from a solid to a gas.</td>
<td></td>
</tr>
<tr>
<td>• The air around you is putting pressure on your body.</td>
<td></td>
</tr>
</tbody>
</table>

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

Write about what you predict is a source of the warm water in a hot natural spring in a cold, snowy climate.
States of Matter
Section 1 Matter

Benchmarks—SC.A.1.3.4: The student knows that atoms in solids are close together and do not move around easily; in liquids, atoms tend to move farther apart; in gas, atoms are quite far apart and move around freely.
Also covers: SC.A.1.3.1, SC.A.1.3.3, SC.H.2.3.1

Skim through Section 1 of your text. Write three questions that come to mind when reading the headings and looking at the illustrations.

1. 
2. 
3. 

Define the term atom in a scientific sentence.

atom

Write the correct vocabulary term next to each definition.

matter that does not have a definite shape or volume

going up space and has mass

matter with a definite shape and volume

a liquid’s resistance to flow

uneven forces acting on the particles on the surface of a liquid

matter with a definite volume but no definite shape that can flow from one place to another

Use a dictionary to define definite.

definite
Section 1 Matter (continued)

Main Idea

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

Solids
I found this information on page __________.

Liquids
I found this information on page __________.

Details

Define matter, and identify the 4 states of matter.
Matter: __________

The Four States of Matter

Create a drawing of the particles in a crystalline solid and in an amorphous solid. Then write a caption explaining how the two types of solids differ.

Crystalline Solid

<table>
<thead>
<tr>
<th>Property</th>
<th>Solids</th>
<th>Liquids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have a definite shape</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have a definite volume</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Particles can move relative to each other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Caption: __________

Contrast solids with liquids by placing checks to show whether the property is true for solids, liquids, or both.

States of Matter 53
Section 1 Matter (continued)

Main Idea

**Liquids**

*I found this information on page ________.*

**Gases**

*I found this information on page ________.*

Details

**Sequence** four substances that you know according to viscosity. Then write a description of a liquid with high viscosity and a liquid with low viscosity.

High viscosity liquid:

Low viscosity liquid:

Organize information about gases.

**Gases**

are made of particles that move
do not have definite
fill the

or

SYNTHESIZE IT

You can walk through air and swim through water, but you can’t pass through a wall. Use what you have learned about matter to explain why this is true.

Name ________________________________ Date ____________

54 States of Matter
States of Matter
Section 2 Matter Changes of State

Benchmarks—SC.A.1.3.4: The student knows that atoms in solids are close together and do not move around easily; in liquids, atoms tend to move farther apart; in gas, atoms are quite far apart and move around freely. Also covers: SC.A.1.3.1, SC.A.1.3.3, SC.A.1.3.5, SC.B.1.3.5, SC.H.1.3.5

Review Vocabulary

Vocabulary

energy

Define the term energy using a dictionary or your book.

New Vocabulary

thermal energy
temperature
heat

Write a paragraph that explains the terms thermal energy, temperature, and heat. Underline each term.

Predict three things that might be discussed in this section after reading the title and headings.

1.

2.

3.

Define the term energy using a dictionary or your book.

Write a definition for each of the following terms.

melting
freezing
vaporization
condensation

Use a dictionary to define item.

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Main Idea

Thermal Energy and Heat

I found this information on page _________.

Details

Classify each phrase to show whether it describes thermal energy, temperature, or both.

- depends on the number of particles
- average energy of particles
- involves kinetic energy of particles
- total energy of particles

Create a drawing to show a glass of lemonade with ice cubes in it. Use arrows to show the movement of thermal energy.

Specific Heat

I found this information on page _________.

Complete the table below on specific heat.

<table>
<thead>
<tr>
<th></th>
<th>Rate at Which Temperature Changes</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substances with high specific heats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substances with low specific heats</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 2 Matter Changes of State (continued)

Main Idea

Changes Between the Solid and Liquid States
I found this information on page __________.

Changes Between the Liquid and Gas States
I found this information on page __________.

Changes Between the Solid and Gas States
I found this information on page __________.

Compare melting and freezing by completing the table.

<table>
<thead>
<tr>
<th></th>
<th>Melting</th>
<th>Freezing</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is it?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is thermal energy released or absorbed?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Distinguish the changes between gas and liquid states by filling in the graphic organizer.

Summarize information about sublimation and give an example of a substance that can sublimate.

EVALUATE IT

A person steps out of the swimming pool on a cool, windy day and feels a cold chill. Explain why the person feels so cold after coming out of the water.
Scan Section 3 of your book. Write three facts you discovered about fluids as you scanned the section.

1. 
2. 
3. 

Define the term force in a sentence to show its scientific meaning.

force

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

pressure

buoyant force

Archimedes’ principle

density

Pascal’s principle

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

expand
Main Idea

Pressure

I found this information on page __________.

Details

Complete the formula for pressure. Then analyze how pressure changes with a change in force or area.

\[
\text{Pressure} = \frac{F}{A}
\]

<table>
<thead>
<tr>
<th>If force</th>
<th>and area</th>
<th>then pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>increases</td>
<td>stays the same</td>
<td></td>
</tr>
<tr>
<td>decreases</td>
<td>stays the same</td>
<td></td>
</tr>
<tr>
<td>stays the same</td>
<td>increases</td>
<td></td>
</tr>
<tr>
<td>stays the same</td>
<td>decreases</td>
<td></td>
</tr>
</tbody>
</table>

Define atmospheric pressure and describe why you do not feel it.

__________________________________________

__________________________________________

__________________________________________

__________________________________________

Create and label a drawing to show how a weather balloon changes size as it rises into the atmosphere. Provide a caption to explain your illustration.

Caption: __________________________________________

_________________________________________________________________

States of Matter 59
Section 3 Behavior of Fluids (continued)

Main Idea

Changes in Gas Pressure

I found this information on page __________.

Details

Complete the graphic organizer to show how changes in volume and temperature can increase pressure.

- Pressure increases
- as volume __________
- as temperature __________

Float or sink?

I found this information on page __________.

Compare the buoyancy of an object that is more dense than water with an object that is less dense than water. Draw and label arrows to show the buoyant force and weight of each.

- More Dense
- Less Dense

Pascal's Principle

I found this information on page __________.

Summarize Pascal's principle, in your own words and give an original example from your life that illustrates the principle.

- __________________________________________________________________________
- __________________________________________________________________________
- __________________________________________________________________________
- __________________________________________________________________________

Evaluate It

Analyze the drawing of ice water. Explain what is wrong with this representation. Also explain why it is wrong.

- __________________________________________________________________________
- __________________________________________________________________________
- __________________________________________________________________________
- __________________________________________________________________________
Tie It Together

Synthesize It

Describe a situation from daily life in which you have experienced each change of state identified below. Explain how thermal energy was involved in the change of state.

Condensation

__________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

Melting

__________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

Freezing

__________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

Evaporation

__________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________
States of Matter  Chapter Wrap-Up

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

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

<table>
<thead>
<tr>
<th>States of Matter</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• There are four states of matter.</td>
<td></td>
</tr>
<tr>
<td>• Solids take the shape of their containers.</td>
<td></td>
</tr>
<tr>
<td>• Substances cannot change directly from a solid to a gas.</td>
<td></td>
</tr>
<tr>
<td>• The air around you is putting pressure on your body.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

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

SUMMARIZE IT

After reading this chapter, identify three things you have learned about states of matter.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

States of Matter  62
Motion and Momentum

Sunshine State Standards—SC.C.1: The student understands that types of motion may be described, measured, and predicted. Also covers: SC.C.2

Before You Read

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

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

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

Science Journal

Describe how your motion changed as you moved from your school’s entrance to your classroom.

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Motion and Momentum

Section 1  What is motion?

Preview the section by reading the What You’ll Learn statements.
Write three questions that come to mind from reading these statements.

1. 
2. 
3. 

Review Vocabulary
Write a sentence that uses the word meter to show its scientific meaning.

meter

New Vocabulary
Define the new vocabulary terms to show their scientific meanings.

speed

average speed

instantaneous speed

velocity

Academic Vocabulary
Use a dictionary to define displace.

displace
Analyze the meaning of relative motion. Complete the sentences.

To determine whether something changes position, you must identify ____________________. An object changes position if ____________________.

Contrast distance and displacement. Draw a diagram showing distance and displacement for a person moving halfway around a park. Label the distance and displacement.

Complete the equation for calculating speed.

\[ \text{speed (in meters/second)} = \]  

Compare and contrast average speed and instantaneous speed. Give an example of average speed, one of instantaneous speed, and one in which instantaneous speed changes.

Average speed: ______________________________________

Instantaneous speed: ______________________________________

Example: ______________________________________
Section 1  What is motion?  (continued)

**Main Idea**

**Graphing Motion**

I found this information on page __________.

**Details**

**Analyze** the distance-time graph. **Graph lines to show**

- Person C whose speed is 2 m/s.
- Person D who is standing still.

**Velocity**

I found this information on page __________.

**Analyze** how an object’s velocity can change. **Identify three ways in which velocity can change.**

1. 
2. 
3. 

**CONNECT IT**

Think of a time recently when you might have run around a track or traveled in a car or bus. Describe the motion thoroughly. Remember to include how your velocity changed.
Benchmarks—SC.C.1.3.1: The student knows that the motion of an object can be described by its position, direction of motion, and speed. Also covers: SC.H.1.3.5

Motion and Momentum
Section 2 Acceleration

Predict three things you will learn in this section. Read the section title and subheadings to help you make your predictions.

1. 
2. 
3. 

Review Vocabulary
Define kilogram. Then use it in a sentence to show its scientific meaning.

kilogram

New Vocabulary
Use your book to write the scientific definition of acceleration. Then use it in a sentence to show its scientific meaning.

acceleration

Academic Vocabulary
Use a dictionary to find the mathematical definition of positive. Then use it in a sentence to show its scientific meaning.

positive

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Distinguish the 3 ways that an object can accelerate. Complete the concept map.

Acceleration includes

1. __________
2. __________
3. __________

Complete the equation to calculate acceleration for objects moving in a straight line.

Acceleration Equation

\[ \text{acceleration} = \frac{\text{(final speed)} - \text{(initial speed)}}{\text{time}} \] (in m/s²)

Analyze the equation above to rewrite it using symbols.

\[ a = \] __________

Compare and contrast positive and negative acceleration in a straight line by completing the table.

<table>
<thead>
<tr>
<th>Types of Acceleration</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationship of initial speed to final speed</td>
<td>Initial speed is less than final speed.</td>
<td></td>
</tr>
</tbody>
</table>
Analyse the acceleration graph below. Label the parts of the graph showing zero acceleration, positive acceleration, and negative acceleration.

A line for positive acceleration slopes ________.

A line for negative acceleration slopes ________.

A line for zero acceleration ________.

Summarise how you can identify each type of acceleration on an acceleration graph. Complete the sentences.

A line for positive acceleration slopes ________________.

A line for negative acceleration slopes ________________.

A line for zero acceleration ________________.

Synthesise it. A jogger runs around a circular track. She starts at a speed of 2 m/s, then speeds up to 6 m/s. She runs at that speed for 20 minutes, and then comes to a stop. Describe her acceleration. Is it ever zero?
Scan the headings, bold words, and illustrations in Section 3.
Write two facts you discovered about momentum as you scanned the section.

1. 

2. 

Define mass to show its scientific meaning.

mass

Define inertia to show its scientific meaning.

inertia

Define momentum to show its scientific meaning.

momentum

Define law of conservation of momentum to show its scientific meaning.

law of conservation of momentum

Define predict to show its scientific meaning.

predict
Mass and Inertia

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

Greater mass

Has __________ inertia

Less mass

Has __________ inertia

List two factors that affect an object’s momentum.

1. __________

2. __________

Summarize the calculation of momentum in words on the lines below.

________________________________________

________________________________________

________________________________________

Complete the equation used to calculate momentum.

momentum = ____________ (in kg) × ____________ (in m/s)

(in kg • m/s)

Analyze the equation above and rewrite it using symbols. Use the letter p to represent momentum.

________________________

Conservation of Momentum

Summarize the law of conservation of momentum in your own words. Two balls that collide are an example.

________________________________________

________________________________________

________________________________________

 ________________________________
Using Momentum Conservation

Model the law of conservation of momentum when a moving object of small mass collides with an object of greater mass that is initially at rest. In the first row, model what happens if the two objects stick together. In the second, model what happens if the two bounce away from each other.

- Use arrows to show the size and direction of each object’s momentum.
- Label each object with its mass, speed, and direction.

<table>
<thead>
<tr>
<th>Before Impact</th>
<th>After Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stick together</td>
<td></td>
</tr>
<tr>
<td>Bounce off</td>
<td></td>
</tr>
</tbody>
</table>

CONNECT IT

At a science fair, contestants can win a prize if they can roll a ball with a specific momentum chosen by the presenter. The contestants have a choice of two balls. One has greater mass than the other. Which would you choose, and why?
Tie It Together

Work with a partner to perform the experiment below to explore changes in momentum.

Materials

- wooden block
- stopwatch
- ball that will roll easily
- tape
- meter stick
- triple-beam balance

1. Find and record the mass of the block and ball, using the balance.

   Block: ________________________________

   Ball: ________________________________

2. Mark a line on the floor with tape. Place the block on the line. Measure a distance of 5 m from the line and mark a second line.

3. Practice rolling the ball until you can roll it from the 5-meter line to the block.

4. Roll the ball from the 5-meter line to the block. Use the stopwatch to time the roll. Then measure how far the block moved from the line when the ball hit it. Use a table like the one below to record your data.

5. Repeat step 4 four more times, varying the speed with which you roll the ball. Record the time and distance for each trial.

6. Use your data to calculate the speed for each trial. Then use that information and the mass of the ball to calculate the momentum of the ball in each trial.

7. Analyze your data. What relationship do you see between the momentum of the ball and the distance the block moved? Why do you think this relationship exists?

---

Data Table

<table>
<thead>
<tr>
<th>Trial</th>
<th>Time</th>
<th>Speed</th>
<th>Momentum</th>
<th>Distance Block Moved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Motion and Momentum  Chapter Wrap-Up

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

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

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

SUMMARIZE IT

After reading this chapter, identify three things you have learned about motion and momentum.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Force and Newton’s Laws

Before You Read

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

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

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

Science Journal

Describe three examples of pushing or pulling an object. How did the object move?

________________________________________

________________________________________

________________________________________
Force and Newton’s Laws
Section 1 Newton’s First Law

Predict three topics that will be discussed in Section 1 as you scan the headings.

1. 

2. 

3. 

Define velocity. Use velocity in a sentence to show its scientific meaning.

Write the correct vocabulary term next to each definition.

force that opposes sliding between two touching surfaces

two or more forces that act on an object and do not cancel each other

combination of all of the forces acting on an object

two or more forces whose effects cancel each other

states that if the net force acting on an object is zero, the object will remain at rest or, if it is moving, continue to move in a straight line with constant speed

a push or pull

Use a dictionary to define constant to show its scientific meaning.
Section 1 Newton’s First Law (continued)

---

Main Idea

**Force**

I found this information on page _________.

---

Details

**Analyze** how forces combine to form a net force.

If forces act in the same direction _____________________.

If forces act in opposite directions _____________________.

**Create** two drawings to show how an object is affected by balanced and unbalanced forces. *Use arrows and labels to show the forces and motion. Below each drawing, explain the effect of the forces.*

**Balanced Forces**

---

---

**Unbalanced Forces**

---

---
Section 1 Newton’s First Law (continued)

Main Idea

Newton’s First Law of Motion

I found this information on page _________.

Details

Summarize Newton’s first law of motion in your own words.

I found this information on page _________.

Friction

I found this information on page _________.

Compare the three types of friction. Complete the concept map.

Friction

What It Is

What It Is

What It Is

Example

Example

Example

SYNTHESIZE IT

A carpenter uses sandpaper to smooth a rough piece of wood. State what type of friction the carpenter is using.

I found this information on page _________.

78  Force and Newton’s Laws
**Force and Newton’s Laws**

**Section 2 Newton’s Second Law**

Benchmarks—SC.C.2.3.6: explains and shows the ways in which a net force can act on an object.
Also covers: SC.A.1.3.2, SC.C.2.3.2, SC.C.2.3.7, SC.H.1.3.1, SC.H.1.3.5, SC.H.3.3.5

---

**Review Vocabulary**

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

acceleration

---

**New Vocabulary**

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

Newton’s second law of motion

---

weight

---

center of mass

---

**Academic Vocabulary**

**Use a dictionary to define require.**

require

---

---

**Read** the What You’ll Learn statements. Write two questions that come to mind as you read the statements.

1. ____________________________________________________________________
2. ____________________________________________________________________
Main Idea

**Force and Acceleration**

I found this information on page _________.

**Gravity**

I found this information on page _________.

**Using Newton’s Second Law**

I found this information on page _________.

Details

**Summarize** Newton’s second law of motion *in your own words.* Then complete the equation used to calculate acceleration.

\[
\text{acceleration (in meters/second}^2\) = \frac{\text{force (in newtons)}}{\text{mass (in kilograms)}}
\]

**Complete** the table to show how mass and distance affect gravitational force.

<table>
<thead>
<tr>
<th>If . . .</th>
<th>Then gravity . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>mass is larger</td>
<td></td>
</tr>
<tr>
<td>mass is smaller</td>
<td></td>
</tr>
<tr>
<td>distance increases</td>
<td></td>
</tr>
<tr>
<td>distance decreases</td>
<td></td>
</tr>
</tbody>
</table>

**Distinguish** between weight and mass by explaining what would happen to the weight and mass of an object if it were taken from Earth to Mars.

On Mars, the weight would ________ because ____________ ____________. The mass would ______________ because ________________ .

**Contrast** speeding up, slowing down, and turning as forms of acceleration. Identify the direction of the force in each case.

<table>
<thead>
<tr>
<th>Acceleration</th>
<th>Direction of Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>speeding up</td>
<td></td>
</tr>
<tr>
<td>slowing down</td>
<td></td>
</tr>
<tr>
<td>turning</td>
<td></td>
</tr>
</tbody>
</table>
The direction of air resistance is . . . It increases as an object . . . When it equals the object’s weight, the net force is . . . When it balances the force of gravity, the object falls . . .

Model how a satellite stays in orbit around Earth. Label the direction of centripetal force and the direction of the satellite’s motion.

Summarize the two factors that affect the air resistance on a falling object.
1. 
2. 

Complete the chart below about the properties of air resistance.

<table>
<thead>
<tr>
<th>The direction of air resistance is . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>It increases as an object . . .</td>
</tr>
<tr>
<td>When it equals the object’s weight, the net force is . . .</td>
</tr>
<tr>
<td>When it balances the force of gravity, the object falls . . .</td>
</tr>
</tbody>
</table>

CONNECT IT
The gravitational force on the Moon is one-sixth the gravitational force on Earth. Hypothesize what it would be like to jump or play ball on the Moon.
Force and Newton’s Laws

Section 3 Newton’s Third Law

Benchmarks—SC.H.1.3.4: The student knows that accurate record keeping, openness, and replication are essential to maintaining an investigator’s credibility with other scientists and society. Also covers: SC.A.1.3.2, SC.C.2.3.5, SC.C.2.3.7, SC.H.1.3.5, SC.H.1.3.7, SC.H.3.3.4

Scan the list below to preview Section 3 of your book.

☐ Read all section titles.
☐ Read all bold words.
☐ Look at all of the pictures.
☐ Think about what you already know about forces and gravity.

Write two facts you discovered about Newton’s third law of motion as you scanned the section.

1. 
2. 

Define force to show its scientific meaning.

force

Use your book to define Newton’s third law of motion.

Newton’s third law of motion

Use a dictionary to define react.

react
Section 3  Newton’s Third Law (continued)

Main Idea

Action and Reaction

I found this information on page __________.

Details

Summarize  Newton’s third law of motion in your own words.

Model how action and reaction forces act in pairs.
• Draw a situation in which a force pair acts.
• Use arrows to label the action and reaction forces.

Analyze how the forces act and how the motions of the objects change.

Sequence the events in a rocket launch that show Newton’s third law. Complete the flow chart.

Rocket fuel is ignited, producing hot gas.

Action force

Reaction force

I found this information on page __________.
Organize information about weightlessness. Complete the concept web.

Weightlessness
I found this information on page ________.

- **Occurs during:**
- **Happens because:**
- **Causes a sensation of:**
- **Happens in spacecraft because:**

**Summarize It**
Explain why action and reaction forces do not cancel each other’s effects. Give an example.


84 Force and Newton's Laws
Think of an activity that you enjoy in your daily life. Describe how each of Newton’s laws applies to your chosen activity. Then, draw a diagram to show how you use force in the activity.

Newton’s First Law of Motion: 


Newton’s Second Law of Motion: 


Newton’s Third Law of Motion: 


Diagram:
Force and Newton’s Laws
Chapter Wrap-Up

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

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

**Review**

*Use this checklist to help you study.*

- [ ] 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 forces and Newton’s laws.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

86  Force and Newton’s Laws
Electromagnetic Waves

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>Electromagnetic Waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A wave transfers energy from one place to another without transferring matter.</td>
<td></td>
</tr>
<tr>
<td>• All electromagnetic waves produce light that you can see.</td>
<td></td>
</tr>
<tr>
<td>• Some electromagnetic waves can damage your skin.</td>
<td></td>
</tr>
<tr>
<td>• Radio and TV stations can broadcast at any frequency.</td>
<td></td>
</tr>
</tbody>
</table>

Sunshine State Standards—SC.A.2: The student understands the basic principles of atomic theory.
Also covers: SC.B.1, SC.H.1

FOLDABLES Study Organizer

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

Science Journal

Describe how sitting in sunlight makes you feel. How can sunlight affect your skin?
Electromagnetic Waves
Section 1 The Nature of Electromagnetic Waves

Benchmarks—SC.B.1.3.6: The student knows the properties of waves; that each wave consists of a number of crests and troughs; and the effects of different media on waves. Also covers: SC.A.2.3.1, SC.B.1.3.3, SC.C.1.3.2, SC.C.2.3.1

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

1. ________________________________
2. ________________________________
3. ________________________________

Define wave to show its scientific meaning.

wave

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

electromagnetic wave

electromagnetic radiation

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

transfer
Section 1 The Nature of Electromagnetic Waves (continued)

Main Idea

Waves in Space

I found this information on page __________.

Forces and Fields

I found this information on page __________.

Details

Compare and contrast mechanical waves and electromagnetic waves by completing the Venn diagram with at least seven different facts.

Distinguish between the 3 types of force fields. List each type and its effect in the chart below.

<table>
<thead>
<tr>
<th>Force Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of force field</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Electromagnetic Waves 89
Model how electromagnetic waves are produced. Then write a caption explaining your model.

Caption:

Complete the outline below to organize information about the properties of electromagnetic waves.

Properties of Electromagnetic Waves

I. Wavelength and frequency
   A. One complete vibration of the particle creates

   
   B. The frequency of an electromagnetic wave is

   

II. Electromagnetic radiation
   A. 

   B. 

SYNTHESIZE IT

Sketch waves of different wavelengths. Label the wavelength in each wave. Identify which of your waves would have the highest and lowest frequencies.
Electromagnetic Waves
Section 2 The Electromagnetic Spectrum

Scan the headings of Section 2 in your book. Identify three topics that will be discussed.

1. 
2. 
3. 

Define prism to show its scientific meaning.

prism

Write a paragraph describing electromagnetic radiation. Use all of the vocabulary words in ways that show their scientific meanings.

electromagnetic spectrum
radio wave
infrared wave
visible light
ultraviolet radiation
X ray
gamma ray

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

vary

Benchmarks—SC.B.1.3.3: The student knows the various forms in which energy comes to Earth from the Sun. Also covers: SC.A.2.3.3, SC.B.1.3.6, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.7
Section 2 The Electromagnetic Spectrum (continued)

Main Idea

Electromagnetic Waves
I found this information on page _________.

Radio Waves
I found this information on page _________.

Infrared Waves
I found this information on page _________.

Visible Light
I found this information on page _________.

Details

Sequence the 6 groups of electromagnetic waves from the lowest frequency and longest wavelength to the highest frequency and shortest wavelength.

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

Create a graphic organizer to identify at least six applications of radio waves.

Identify two key facts about infrared waves.

1. Infrared waves are emitted strongly by __________________________
   __________________________
2. Infrared waves can be detected by __________________________
   __________________________

Summarize why visible light has different colors.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Section 2 The Electromagnetic Spectrum (continued)

**Main Idea**

**Ultraviolet Radiation**

*I found this information on page ________.*

**X Rays and Gamma Rays**

*I found this information on page ________.*

**Astronomy with Different Wavelengths**

*I found this information on page ________.*

**Details**

Distinguish the effects of ultraviolet radiation on the human body.

Harmful effect(s):  
_________________________________________________________________  
_________________________________________________________________

Helpful effect(s):  
_________________________________________________________________
_________________________________________________________________

**Compare and contrast** X rays and gamma rays. Complete the Venn diagram.

**Analyze** why astronomers use satellites to study objects in space that do not produce visible light.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

**SUMMARIZE IT**

Explain how electromagnetic waves are used by air-traffic controllers to monitor and track airplane traffic.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

_________________________________________________________________
Electromagnetic Waves
Section 3 Using Electromagnetic Waves

Scan the list below to preview Section 3 of your book.

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

Write three facts you discovered about using electromagnetic waves as you scanned this section.

1. ________________________________
2. ________________________________
3. ________________________________

Define satellite to show its scientific meaning.

satellite ________________________________

Use your book to define the following terms.

carrier wave
Global Positioning System

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

enable ________________________________
Section 3 Using Electromagnetic Waves (continued)

**Main Idea**

**Telecommunications**  
*I found this information on page _________.*

**Using Radio Waves**  
*I found this information on page _________.*

**Telephones**  
*I found this information on page _________.*

---

**Details**

**Organize** *examples of telecommunication.*

**Telecommunications**

---

**Sequence** *the process by which radio transmissions travel from a station to your radio. Include information about both AM and FM radio. The first step has been completed for you.*

1. A radio station broadcasts its assigned frequency as a carrier wave.

2. ____________________________________________________________________

3. ____________________________________________________________________

4. ____________________________________________________________________

5. ____________________________________________________________________

**Classify** *the different ways electrical signals from a telephone can be sent to a receiving telephone.*

An electrical signal representing sound waves

is sent directly through

is changed into

and sent through

and sent through

---

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Section 3 Using Electromagnetic Waves (continued)

**Main Idea**

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

**Communication Satellites**
* I found this information on page __________.

**The Global Positioning System**
* I found this information on page __________.

**Details**

**Sequence** the events that occur when a pager is used.

- A number is dialed.

**Summarize** how radio signals are sent to the other side of the world.

**Complete** the graphic organizer below to identify the information provided by a Global Positioning System.

**CONNECT IT**

Describe at least two possible uses of a Global Positioning System.

---

96 Electromagnetic Waves
Tie It Together

Design a Banner

*With a partner, create a large banner or poster about different types of electromagnetic radiation.*

• **Draw the electromagnetic spectrum on your banner.**

• **Identify each type of electromagnetic wave and its wavelength range.**

• **Include interesting facts and uses for each type of wave.**

• **Add one or two pictures for each type of wave to show how people use that type of radiation.**
Electromagnetic Waves Chapter Wrap-Up

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

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

<table>
<thead>
<tr>
<th>Electromagnetic Waves</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A wave transfers energy from one place to another without transferring matter.</td>
<td></td>
</tr>
<tr>
<td>• All electromagnetic waves produce light that you can see.</td>
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</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

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

SUMMARIZE IT

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

Think about the term thermal energy. List as many words as you can think of that use therm- as part of their root word.

__________  __________

__________  __________

__________  __________

__________  __________

__________  __________

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

Describe five things that you do to make yourself feel warmer or cooler.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Benchmarks—SC.A.1.3.3: The student knows that temperature measures the average energy of motion of the particles that make up the substance. Also covers: SC.B.1.3.2, SC.B.1.3.4, SC.H.1.3.5

Thermal Energy
Section 1 Temperature and Thermal Energy

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

1. __________________________________________
2. __________________________________________
3. __________________________________________

Define the following term using your book or a dictionary.

kinetic energy

New Vocabulary

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

temperature

thermal energy

Academic Vocabulary

Use a dictionary to define random. Then use random in a sentence to show its scientific meaning.

random

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Molecules are always __________________. Energy of motion is called __________________. Molecules have more __________________ when they are moving __________________. Temperature is __________________ __________________ __________________ __________________.

Compare the three temperature scales in the chart below.

<table>
<thead>
<tr>
<th>Characteristics of Each Scale</th>
<th>Fahrenheit</th>
<th>Celsius</th>
<th>Kelvin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature at which water freezes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature at which water boils</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of degrees between water’s freezing and boiling points</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Organize the formulas from your book into the conversion chart.

<table>
<thead>
<tr>
<th>Formula</th>
<th>Break the calculation down</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fahrenheit to Celsius</td>
<td></td>
</tr>
<tr>
<td>Celsius to Fahrenheit</td>
<td></td>
</tr>
<tr>
<td>Celsius to Kelvin</td>
<td></td>
</tr>
</tbody>
</table>
Compare the potential energy of molecules with the potential energy of a ball. Complete the statements that have been started for you.

<table>
<thead>
<tr>
<th>Potential Energy Statements</th>
<th>Ball Analogy Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Molecules in a material exert attractive forces on each other.</td>
<td>Gravity exerts an ____________</td>
</tr>
<tr>
<td>2. Molecules in a material have potential energy.</td>
<td>A ball ____________ has potential energy.</td>
</tr>
<tr>
<td>3. As molecules move closer together or farther apart, potential energy changes.</td>
<td>As a ball moves closer to or farther from Earth’s surface, ____________</td>
</tr>
</tbody>
</table>

**Synthesize** Suppose you have two balls of colored dough, each at 22°C. One ball is blue, the other is yellow. When the two balls are mixed together, their total mass is 100g of green dough. Mark the statements that are true about this thermal energy analogy. Correct any false statements so they become true.

- The mass of the green dough is twice the mass of the blue dough.
- The mass of the green dough is equal to the sum of the mass of the yellow and the blue dough.
- The thermal energy of the green dough is equal to twice the sum of thermal energy of the yellow and the blue dough.
Thermal Energy
Section 2 Transferring Thermal Energy

Benchmarks—SC.B.1.3.5: The student knows the processes by which thermal energy tends to flow from a system of higher temperature to a system of lower temperature. Also covers: SC.H.1.3.5

Use the checklist below to preview Section 2 of your text.

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

Write three facts you discovered about heat.
1. ________________________________________________________________
2. ________________________________________________________________
3. ________________________________________________________________

Use the term electromagnetic wave in a scientific sentence.

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Define Read the definitions below, and write the key term on the blank in the left column.

_________________________
transfer of thermal energy by the movement of particles in a gas or liquid

_________________________
transfer of thermal energy by direct contact by collisions between particles

_________________________
thermal energy that is transferred from a substance at a higher temperature to a substance at a lower temperature

_________________________
material that transfers heat easily

_________________________
amount of heat needed to raise the temperature of 1 kg of a substance by 1°C

_________________________
transfer of energy by electromagnetic waves
Section 2 Transferring Thermal Energy (continued)

**Main Idea**

**Heat and Thermal Energy**

*I found this information on page _________.

**Details**

*Label the two drawings to illustrate the statement: Heat is transferred when objects that differ in temperature are brought into contact.*

- Label the temperature of each object.
- Draw an arrow showing the direction of heat transfer.

![Heat transfer and No heat transfer drawings]

**Conduction, Radiation, and Convection**

*I found this information on page _________.

**Analyze** the drawing below to help classify each type of energy transfer as conduction, convection, or radiation.

The Sun’s rays heat the sand particles by ______________.

Body heat is transferred to the air by ______________.

Cool air pushes in to replace warm air flow by natural ______________.

Heat is transferred from sand to towel to body by ______________.

Heat from the Sun warms iced tea by ______________.

The fan pushes air molecules by forced ______________.

Warmer molecules move more quickly, transferring heat throughout the iced tea by ______________.
Main Idea

Thermal Conductors and Thermal Insulators

I found this information on page __________.

Details

Compare and contrast thermal conductors and thermal insulators by writing the words and phrases in the Venn diagram.

- does not conduct heat easily
- conducts heat easily
- gold and copper
- air

- material contains some loosely held electrons
- materials do not contain loosely held electrons

Thermal Conductors

Both

Thermal Insulators

CONNECT IT

Analyze sources of thermal pollution and their effects on organisms and the environment. Design a possible plan to reduce thermal pollution.

<table>
<thead>
<tr>
<th>Source</th>
<th>Effect on Organisms</th>
<th>Effect on the Environment</th>
<th>Plan to Reduce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory cooling towers</td>
<td>Increased water temperature</td>
<td>Decreased biodiversity</td>
<td>Install water filtration systems</td>
</tr>
<tr>
<td>Power plant cooling ponds</td>
<td>Thermal stratification</td>
<td>Reduced oxygen levels</td>
<td>Implement water circulation systems</td>
</tr>
<tr>
<td>Thermal bottom water discharges</td>
<td>Thermal stress on fish</td>
<td>Altered fish populations</td>
<td>Use cooler water sources</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Plan Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase monitoring efforts</td>
</tr>
<tr>
<td>Public awareness campaigns</td>
</tr>
<tr>
<td>Implement eco-friendly technologies</td>
</tr>
</tbody>
</table>

Thermal Energy 105
Thermal Energy
Section 3 Usable Energy

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

1. 

2. 

3. 

Review Vocabulary
Define the following term to show its scientific meaning.

work

New Vocabulary
Use your book or a dictionary to define the key terms.

law of conservation of energy

heat engine

system

entropy

Academic Vocabulary
Use your book or a dictionary to define convert to show its scientific meaning.

convert
Identify the 6 different forms of energy and give an example for each.

<table>
<thead>
<tr>
<th>Types of Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Analyze the energy conversions in an internal combustion engine. Complete the diagram and paragraph below.

In a car, about ____________ percent of the chemical energy in the ____________ is eventually converted into ____________ of the car’s moving parts. Because ____________ between the moving parts produces additional ____________, about ____________ percent of the energy from the ____________ finally makes the engine, the car, and the surroundings ____________.

Complete the energy efficiency equation.

energy efficiency (%) = _______________ × 100
Compare the amount of entropy in molecules in the two examples of matter.

**Less Entropy** → **More Entropy**

<table>
<thead>
<tr>
<th>Molecules in an ice cube:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ______________________</td>
</tr>
<tr>
<td>2. ______________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gas molecules in a balloon:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ______________________</td>
</tr>
<tr>
<td>2. ______________________</td>
</tr>
</tbody>
</table>

Summarize the second law of thermodynamics.

The second law of thermodynamics states that ____________

This means that in any system, changes that occur cause ____________.

Label the diagram to show what is increasing and what is decreasing during an energy conversion. Use the terms usable energy, waste energy, and entropy.

Increasing __________________

Decreasing __________________

Describe a situation in your life that relates to the concept of entropy.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Tie It Together

Synthesize

Suppose that you are a television weather forecaster. As a part of your job, you have been asked to help educate people about science. On the lines below, plan a weather forecast for your region. After you have finished planning, present your forecast to the class. Explain as many of the following terms as possible during your forecast.

- temperature
- Fahrenheit scale
- Celsius scale
- radiation
- convection
- conduction

Tomorrow’s Weather Forecast

Date: ___________________________ Location: ___________________________

Forecast: ___________________________________________________________

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Notes about terms: __________________________________________________

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
Thermal Energy Chapter Wrap-Up

After You Read

Examine the list of terms that include the root therm- that you wrote at the beginning of this chapter. Write in the space below what you think therm- means.

______________________________

______________________________

______________________________

Review

Use this checklist to help you study.

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

Summarize It

After reading this chapter, identify three things you have learned about thermal energy.

______________________________

______________________________

______________________________

______________________________

______________________________
The Solar 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>• 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>

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.

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________
Benchmarks—SC.E.1.3.1: The student understands the vast size of our Solar System and the relationship of the planets and their satellites. Also covers: SC.C.2.3.7, SC.D.1.3.5, SC.E.1.3.3, SC.H.1.3.1, SC.H.1.3.4, SC.H.1.3.5, SC.H.1.3.6, SC.H.2.3.1, SC.H.3.3.5, SC.H.3.3.6

The Solar System
Section 1 Solar System Models

Skim the headings in Section 1. Write three things you expect to learn in Section 1.

1. __________________________________________

2. __________________________________________

3. __________________________________________

Define planet, using your book or a dictionary.

planet

Write a scientific sentence describing the solar system.

solar system

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 table 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 planets.
Main Idea

How the Solar System Formed

I found this information on page ________.

Details

Sequence the steps in the formation of the solar system.

1. ___________________________________________________________
   ___________________________________________________________

2. ___________________________________________________________
   ___________________________________________________________

3. ___________________________________________________________
   ___________________________________________________________

4. ___________________________________________________________
   ___________________________________________________________

Motions of the Planets

I found this information on page ________.

Summarize Johannes Kepler’s contributions to the scientific understanding of planets’ motion. Complete the outline.

I. Shape of orbits
   A. _________________________________________________________
   B. _________________________________________________________

II. Movement of planets
   A. _________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   B. _________________________________________________________
   ___________________________________________________________

Summarize how ideas about the structure and motions of the solar system have changed over time.

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

____________________________________________________________________________________________________________________

Section 1 Solar System Models (continued)
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 to show its scientific meaning.

reveal
Section 2 The Inner Planets (continued)

Main Idea

Mercury
I found this information on page _________.

Venus
I found this information on page _________.

Earth
I found this information on page _________.

**Details**

Organize key facts about Mercury. Complete the table.

<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.

Earth
Summarize unique features of Earth that allow it to support life.
Summarize important information about Mars as you complete the concept map.

**Main Idea**

**Mars**

*I found this information on page ________.*

**Details**

**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.

---

**Surface Features**

**Space Probes**

**Atmosphere**

**Seasons**

**Moons**
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.

moon _______________________________________________________

Label each definition with the correct vocabulary word.

_________________________________ 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.

survey ___________________________________________________
   _________________________________________________________

Name ___________________________ Date _______________________
Section 3 The Outer Planets (continued)

Jupiter

Main Idea

I found this information on page _________.

Details

Sequence the space probes that have explored Jupiter.

1979: ____________________________________________

1995: ____________________________________________

2000: ____________________________________________

Complete the table to identify key facts about Jupiter.

<table>
<thead>
<tr>
<th>Jupiter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmosphere</td>
</tr>
<tr>
<td>Moons</td>
</tr>
</tbody>
</table>

Saturn

Main Idea

I found this information on page _________.

Details

Organize key facts about Saturn.

<table>
<thead>
<tr>
<th>Saturn</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

I found this information on page __________.

Neptune

I found this information on page __________.

Pluto

I found this information on page __________.

**Details**

**Uranus**

Summarize details about Uranus in the graphic organizer.

- Composition

- Moons

- Rotation

**Neptune**

Complete the table 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>

**Connect It**

Summarize the major features that distinguish the outer planets from the inner planets.

---

120 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.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

Review Vocabulary

Create a scientific sentence using the term crater.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

New Vocabulary

Define each term, using your book or a dictionary.

comet
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

meteor
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

meteorite
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

asteroid
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

Academic Vocabulary

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. Draw and 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.

Meteoroids, Meteors, and Meteorites
I found this information on page ________.

Distinguish between meteoroids, meteors, and meteorites. Complete the graphic organizer. 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 ____________. They come from

Another term for these is ____________.

Another term for these is ____________.
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 table.
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 to these.

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

<table>
<thead>
<tr>
<th>The 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.
Construct the Foldable as directed at the beginning of this 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>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>

Write a description of a galaxy in your Science Journal.

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>
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<tbody>
<tr>
<td>• Modern astronomy divides the sky into 88 constellations.</td>
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<tr>
<td>• All stars have the same brightness.</td>
<td></td>
</tr>
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<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>

Write a description of a galaxy in your Science Journal.
Stars and Galaxies
Section 1 Stars in Our Galaxy

Benchmarks—SC.E.2.3.1: The student knows that thousands of other galaxies appear to have the same elements, forces, and forms of energy found in our Solar System. Also covers: SC.D.1.3.5, SC.E.1.3.3, SC.E.1.3.4, SC.H.2.3.1,
SC.H.3.3.5

Predict three topics that will be discussed in Section 1 as you scan the headings and illustrations.
1. 
2. 
3. 

Define gravitation to show its scientific meaning.

Define the following terms to show their scientific meanings.

constellation

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.
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.

Absolute and Apparent Magnitudes
I found this information on page __________.

Effect of Distance on Magnitude

Absolute magnitude ____________

Apparent magnitude ____________
Analyze the diagram below. Draw lines to show the parallax angle of each star.

Summarize how astronomers use parallax.

Sequence the colors of stars by temperature. Complete the diagram by writing the correct color in each box.

A hot, blue-white star has brighter absolute magnitude than a cooler, red star. The red star appears brighter. 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

Copy 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
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
Section 2 The Sun (continued)

Main Idea

Surface Features
I found this information on page _________.

Details

Organize information about the Sun’s surface features.

Sunspots: __________________________
______________________________
______________________________

Prominences: __________________________
______________________________
______________________________

Flares: __________________________
______________________________
______________________________

Coronal mass ejection (CME): __________________________
______________________________
______________________________

The Sun in Space
I found this information on page _________.

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.

__________________________
__________________________
__________________________
Scan the headings of Section 3 to find three stages of the evolution of stars.

1. ________________________________
2. ________________________________
3. ________________________________

**Review Vocabulary**

Define **gas**. Use the term in a sentence to show its scientific meaning.

**gas**
______________________________
______________________________
______________________________

**New Vocabulary**

Define the following terms. Write a sentence to show each term’s scientific meaning.

**nebula**
______________________________
______________________________
______________________________

**white dwarf**
______________________________
______________________________
______________________________

**neutron star**
______________________________
______________________________
______________________________

**Academic Vocabulary**

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

**enormous**
______________________________
Main Idea

Classifying Stars

I found this information on page __________.

Details

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?

I found this information on page __________.

Summarize how stars generate energy.
Main Idea

Evolution of Stars

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

Details

I found this information on page _________.

Section 3 Life Cycle of Stars (continued)

Evaluate why supernovas are important to the existence of life on Earth.

CONNECT IT
Stars and Galaxies
Section 4 Galaxies and the Universe

Benchmarks—SC.H.1.3.5: The student knows that a change in one or more variables may alter the outcome of an investigation. Also covers: SC.D.1.3.5, SC.E.1.3.3, SC.E.2.3.1, SC.H.2.3.1, SC.H.3.3.5

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.

universe

Define the following key terms. Then write sentences to show the scientific meaning of each term.

galaxy

big bang theory

Define normal. Write a sentence to show its scientific meaning.

normal

Stars and Galaxies 135
Section 4 Galaxies and the Universe (continued)

Main Idea

Galaxies
I found this information on page ___________.

The Milky Way
I found this information on page ___________.

Classify the 3 major types of galaxies. Complete the table.

<table>
<thead>
<tr>
<th>Galaxy Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spiral arms that wind outward from the center</td>
</tr>
<tr>
<td></td>
<td>Does not look like the other two types of galaxies; many possible shapes</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 __________.

**Details**

**Contrast** two models of the origin of the universe: the steady state theory and the oscillating model.

Steady state theory: ________________________________

______________________________

Oscillating model: ________________________________

______________________________

**Expansion of the Universe**

I found this information on page __________.

**The Big Bang Theory**

I found this information on page __________.

**Summarize** the big bang theory of the origin of the universe.

______________________________

______________________________

______________________________

**Observation**

Conclusion

______________________________

______________________________

______________________________

**Summarize IT**

Describe your location in the universe as completely as you can.

______________________________

______________________________

______________________________

______________________________

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

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

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

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

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about stars and galaxies.
Cell Reproduction

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>Cell Reproduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• One-celled organisms reproduce through cell division.</td>
</tr>
<tr>
<td></td>
<td>• Every living organism has a life cycle.</td>
</tr>
<tr>
<td></td>
<td>• All organisms reproduce sexually.</td>
</tr>
<tr>
<td></td>
<td>• Most of the cells formed in your body do not contain genetic material.</td>
</tr>
</tbody>
</table>

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

Science Journal

Write three things that you know about how and why cells reproduce.

____________________
____________________
____________________
____________________
____________________
____________________
____________________
____________________
Cell Reproduction
Section 1 Cell Division and Mitosis

Benchmarks—SC.F.1.3.3: The student knows that in multicellular organisms cells grow and divide to make more cells in order to form and repair various organs and tissues. Also covers: SC.F.1.3.1, SC.F.1.3.5, SC.F.2.3.1, SC.H.1.3.5, SC.H.1.3.6, SC.H.2.3.1

**Skim** Section 1 of your book. Read the headings, illustrations, and captions. Write three questions that come to mind as you skim the section.

1. 
2. 
3. 

**Review Vocabulary**

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

nucleus

**New Vocabulary**

Locate sentences in your book that use each of the following terms. Write each sentence here, and give the page on which you found it.

mitosis

chromosome

asexual reproduction

**Academic Vocabulary**

Use a dictionary to write a scientific definition of the term cycle. Then find a sentence in this section that defines the cell cycle, and write it here.

cycle
Section 1 Cell Division and Mitosis (continued)

**Main Idea**

**Why is cell division important?**

*Identify the 3 reasons cell division is important.*

1. 
2. 
3. 

**The Cell Cycle**

*I found this information on page __________.*

**Summarize information about interphase in eukaryotic cells in the following paragraph.**

Interphase is the __________ part of the cell cycle. During interphase, cells __________ and __________. During interphase, cells that are still dividing copy their __________ and prepare for __________. Cells no longer dividing are __________.

**Mitosis**

*I found this information on page __________.*

**Sequence the steps of mitosis, and write a short description of what takes place in each phase.**

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

---

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Compare mitosis in animals and plants. State if each feature exists in plant cells, animal cells, or both.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Cell Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centrioles</td>
<td></td>
</tr>
<tr>
<td>Spindle fibers</td>
<td></td>
</tr>
<tr>
<td>Cell plate</td>
<td></td>
</tr>
<tr>
<td>Cell wall</td>
<td></td>
</tr>
</tbody>
</table>

Organize important concepts about mitosis.

1. Mitosis is the division of a _____________.

2. Mitosis produces two new nuclei that are identical both to _____________.

3. A nucleus with 46 chromosomes that undergoes mitosis will produce _______ nuclei, each with _______ chromosomes.

Identify the 3 forms of asexual reproduction described below.

1. ____________ the method by which bacteria reproduce
2. ____________ new organism growing from body of the parent
3. ____________ to regrow body parts that are lost or damaged

A strawberry farmer wants to increase her crop without spending large amounts of money for new seeds. How can she take advantage of asexual reproduction to increase her crop?

CONNECT IT

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Skim the headings and illustrations in Section 2. Write three things you think you will learn about in this section.

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

Define organism to show its scientific meaning.

organism

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

in sexual reproduction, the joining of a sperm and egg

new diploid cell formed when a sperm fertilizes an egg; will divide by mitosis and develop into a new organism

sex cell formed in the female reproductive organs

cell whose similar chromosomes occur in pairs

reproductive process that produces haploid cells

haploid sex cell formed in the male reproductive organs

cells that have only half of each pair of chromosomes

type of reproduction in which two sex cells join to form a zygote

Use a dictionary to write a definition of similar.

similar
Compare characteristics of human diploid and haploid cells in the table below. Give examples of each type of cell.

<table>
<thead>
<tr>
<th>Types of Human Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Diploid</td>
</tr>
<tr>
<td>Haploid</td>
</tr>
<tr>
<td>Number of chromosomes</td>
</tr>
<tr>
<td>Process that produces them</td>
</tr>
<tr>
<td>Examples</td>
</tr>
</tbody>
</table>

Model the 4 stages of meiosis I in the spaces below. Use the figure in your book to help you.

<table>
<thead>
<tr>
<th>Meiosis I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophase I</td>
</tr>
<tr>
<td>Anaphase I</td>
</tr>
</tbody>
</table>
Main Idea

Model what takes place inside a cell nucleus during the meiosis II by drawing the 4 phases in the spaces below.

<table>
<thead>
<tr>
<th>Meiosis II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophase II</td>
</tr>
<tr>
<td>Metaphase II</td>
</tr>
<tr>
<td>Anaphase II</td>
</tr>
<tr>
<td>Telophase II</td>
</tr>
</tbody>
</table>

Summarize differences between meiosis I and meiosis II by writing a number, yes, or no in each box of the chart.

<table>
<thead>
<tr>
<th></th>
<th>Meiosis I</th>
<th>Meiosis II</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many cells result?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is a haploid cell formed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do chromatids separate?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SYNTHESIZE IT

Fruit flies have eight chromosomes in their body cells. Mice have 40. How many chromosomes are there in each sex cell of these organisms?
Scan the list below to preview Section 3.

- Read all section titles.
- Read all bold words.
- Look at all illustrations and their labels.
- Think about what you already know about DNA.

Define heredity to show its scientific meaning.

**heredity**

[Definition]

Write the correct vocabulary term next to each definition.

**deoxyribonucleic acid**; a cell’s heredity material; made up of two strands, each consisting of a sugar-phosphate backbone and nitrogen bases: adenine, thymine, guanine, and cytosine

**section of DNA** that contains instructions for making specific proteins

**ribonucleic acid**; type of nucleic acid that contains the sugar ribose, phosphates, and bases adenine, guanine, cytosine, and uracil

**any permanent change** in a gene or chromosome of a cell; may be beneficial, harmful, or have little effect on an organism

The word code can be used as a noun or as a verb. Write a definition for its use as a noun and as a verb.

**code**

Noun:

[Definition]

Verb:

[Definition]
Identify the 4 nitrogen bases found in DNA.

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

Model a section of a DNA molecule, showing its twisted-ladder structure. Label the nitrogen bases, sugar, and phosphates. Make sure the nitrogen bases in your drawing are correctly paired.

Summarize how DNA copies itself.

Complete the following paragraph on the relationship of proteins and genes.

Proteins are made up of long chains of ____________________.

Genes determine the ________________ of ____________________ in a protein. Changing the ________________ of the amino acids makes a ________________ protein.
Complete the table on the 3 main kinds of RNA.

<table>
<thead>
<tr>
<th>Type of RNA</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>carries the code to make proteins from the nucleus to the cytoplasm</td>
</tr>
<tr>
<td>transfer RNA (tRNA)</td>
<td>type of RNA contained in ribosomes</td>
</tr>
</tbody>
</table>

Complete the steps of protein production within a cell.

1. mRNA moves into the cytoplasm.
2. A(n) attaches to it.
3. molecules bring to the ribosomes.
4. Nitrogen bases on the temporarily the nitrogen bases on the.
5. The same process occurs with another molecule and the next portion of the molecule.
6. The attached to the two molecules, beginning the formation of a protein.

Describe how mutations can affect an organism.

A man has a discolored area on the back of his hand. The doctor has assured him it is a harmless body cell mutation. Explain why the mutation probably will not appear in his children.
Tie It Together

Draw an animal cell with six chromosomes.
Follow the chromosomes as they go through the steps of meiosis.
Show the chromosomes duplicating and separating, and describe the final end products.
Name each step in the process.
Show one way that a mutation might occur during the process.
Cell Reproduction Chapter Wrap-Up

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

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

<table>
<thead>
<tr>
<th>Cell Reproduction</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-celled organisms reproduce through cell division.</td>
<td></td>
</tr>
<tr>
<td>Every living organism has a life cycle.</td>
<td></td>
</tr>
<tr>
<td>All organisms reproduce sexually.</td>
<td></td>
</tr>
<tr>
<td>Most of the cells formed in your body do not contain genetic material.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

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

Summarize It

After reading this chapter, identify three things you have learned about cell reproduction.

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Plant Reproduction

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.

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<thead>
<tr>
<th>Before You Read</th>
<th>Plant Reproduction</th>
</tr>
</thead>
<tbody>
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<tr>
<td>• Ferns and mosses reproduce by forming spores.</td>
<td></td>
</tr>
<tr>
<td>• All seeds are produced by flowering plants.</td>
<td></td>
</tr>
<tr>
<td>• Some seeds are spread by gravity.</td>
<td></td>
</tr>
</tbody>
</table>

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

List three plants that reproduce by forming seeds.

__________________________________________
__________________________________________
__________________________________________
__________________________________________
__________________________________________
Plant Reproduction

Section 1 Introduction to Plant Reproduction

Benchmarks—SC.F.2.3.1: The student knows the patterns and advantages of sexual and asexual reproduction in plants and animals. Also covers: SC.F.1.3.1, SC.F.1.3.3, SC.F.2.3.2, SC.H.2.3.1

Scan Section 1 of your book using the checklist below.

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

Write three facts that you discovered about plant reproduction as you scanned this section.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Define fertilization in a sentence that shows its scientific meaning.

fertilization

Use your book to define the following terms.

spore

gametophyte stage

sporophyte stage

Use a dictionary to define identical.

identical
Main Idea

Types of Reproduction

I found this information on page __________.

Details

Compare and contrast two ways that plants reproduce.

Sequence the steps in plant fertilization. Complete the flow chart.

Female reproductive structures produce __________.

Male reproductive structures produce __________.

Are both structures found on the same plant?

No

Yes

I found this information on page __________.
Main Idea

Plant Life Cycles
I found this information on page __________.

Details

Model the two stages of a plant’s life cycle by labeling the diagram below with the following terms.

- gametophyte plant structures ($n$)
- sporophyte plant structures ($2n$)
- sex cells (sperm and eggs) ($n$)
- spores ($n$)

Contrast the gametophyte and sporophyte stages of plant development. Complete the table.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Cell type</th>
<th>Reproductive cells formed</th>
<th>How reproductive cells form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gametophyte</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sporophyte</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CONNECT IT

A plant breeder wants to develop new varieties of roses that have different traits from the varieties he already has. Describe the type of reproduction the breeder is most likely to use and why.
Skim Section 2 of your book. Read the headings and look at the illustrations. Write three questions that come to mind.

1. 
2. 
3. 

Use your book or a dictionary to define photosynthesis.

photosynthesis

Use your book to define the following terms.

frond

rhizome

sori

prothallus

Use a dictionary to define widespread.

widespread
**Main Idea**

**The Importance of Spores**

I found this information on page __________.

**Details**

**Summarize** the role of spores in plant reproduction.

Spores are used by ________________________________
______________________________ to reproduce. The ________________
stage of the plant produces ________________ spores in
_______________________________. These ______________________, and the
spores are spread by __________________. The spores grow into
______________________________ that can produce ____________________.

**Sequence** the life cycle of a moss. Complete the flow chart.

_______ begins
the sporophyte stage.

_______ occurs,
producing __________
spores.

_______ swims to
the __________, and
_______ occurs.

Spores grow into __________
___________ that produce
__________________.

**Distinguish** two ways in which nonvascular plants reproduce asexually.

<table>
<thead>
<tr>
<th>Type of Plant</th>
<th>Asexual Reproduction Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>moss</td>
<td></td>
</tr>
<tr>
<td>liverwort</td>
<td></td>
</tr>
</tbody>
</table>
Section 2 Seedless Reproduction (continued)

Main Idea

Vascular Seedless Plants

Contrast vascular and nonvascular seedless plants. Complete the Venn diagram.

- Vascular
- Both
- Nonvascular

Organize the life cycle of a fern into a flow chart.

- Spore grows into the plant, called the ____________.
- Male and female ____________ form in the ____________.
- ____________ occurs, producing a ____________.
- ____________ stage develops from ____________.
- ____________ takes place inside ____________.
- Spores ____________

CONNECT IT

Suppose that you are walking through a forest and you see some moss plants and ferns. Describe how you could know the stage of its life cycle each kind of plant is in.

Name _____________________________ Date _____________

Plant Reproduction 157
Predict three things that will be discussed in Section 3.
1. _____________________________________________
2. _____________________________________________
3. _____________________________________________

Use your book or a dictionary to define gymnosperms.

Match each vocabulary term to its definition.

1. __________________________ small structure produced by the male reproductive organs of a seed plant
2. __________________________ transfer of pollen grains to the female part of a seed plant
3. __________________________ series of events that results in the growth of a plant from a seed
4. __________________________ part of a plant that produces the egg
5. __________________________ male reproductive organ in a flower
6. __________________________ female reproductive organ in a flower
7. __________________________ part of a flower in which ovules are found

Use a dictionary to define structure as it is used in science.
Summary key facts about pollen and pollination. Complete the outline.

Pollen and Pollination in Seed Plants

I. Pollen grains
   A. 
   B. 

II. Pollination
   A. 
   B. 

Model a seed. Draw a seed and label the stored food, embryo, and seed coat. Identify the role of each part of the seed.

Sequence steps of gymnosperm seed formation in the flow chart.

Male: ________ produced in ________
Female: ________ produced in ________

carried by

carried by

fertilization

I found this information on page ________.

The Importance of Pollen and Seeds

I found this information on page ________.

Gymnosperm Reproduction

I found this information on page ________.
Main Idea
Angiosperm Reproduction
I found this information on page __________.

Details
Model a flower by drawing and labeling its parts. Then write a brief caption to identify the male and female reproductive organs and to describe how each organ functions during fertilization.

Seed Dispersal
I found this information on page __________.

Sequence the events of fertilization and germination in angiosperms.

1. Flower is ____________________________.
2. ____________________________.
3. ____________________________.
4. Seed is ____________________________.
5. Conditions become right for ____________________________.
6. ____________________________.
7. ____________________________.
8. Root grows from ____________________________.
9. ____________________________.

Connect It
The seeds of horse chestnut trees are covered with a prickly outer layer. Propose a way that you think these seeds might be dispersed.
Tie It Together

Describe a Plant

Suppose that you are an explorer who has discovered a new species of plant.
  • Draw and describe the plant below.
  • Be sure to indicate whether your plant is vascular or nonvascular.
  • If it does reproduce with seeds, identify it as an angiosperm or a gymnosperm.
  • Include a diagram that shows the plant’s life cycle.
  • Draw a cross-section of the plant that identifies its reproductive structures.
Plant Reproduction  Chapter Wrap-Up

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

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<thead>
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<th>Plant Reproduction</th>
<th>After You Read</th>
</tr>
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SUMMARIZE IT

After reading this chapter, identify three things you have learned about plant reproduction.

________________________________________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________________________________________

162  Plant Reproduction
Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
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<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Human Regulation and Reproduction</th>
</tr>
</thead>
<tbody>
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<td></td>
</tr>
<tr>
<td>• Testosterone is the male sex hormone and sperm is the male reproductive cell.</td>
<td></td>
</tr>
<tr>
<td>• Identical twins are not always the same sex.</td>
<td></td>
</tr>
<tr>
<td>• Adulthood is the final stage of human development.</td>
<td></td>
</tr>
</tbody>
</table>

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

Science Journal

Write a paragraph describing how an emergency call might be handled at a fire station.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

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

Human Regulation and Reproduction

Section 1 The Endocrine System

Scan the headings, charts, and illustrations in Section 1. Find two glands of the endocrine system that are involved in regulating blood sugar levels and two glands that are involved in regulating calcium levels.

<table>
<thead>
<tr>
<th>Helps Regulate Blood Sugar Levels</th>
<th>Helps Regulate Calcium Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Review Vocabulary

Define organ to show its scientific meaning. Then use the word in an original sentence.

organ

New Vocabulary

Define hormone to show its scientific meaning.

hormone

Define transport to show its scientific meaning. Then use the word in an original sentence.

transport
Organize information about the body’s control systems by completing the table below.

<table>
<thead>
<tr>
<th>Body System</th>
<th>Function</th>
<th>Body’s Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sequence the events that occur when a gland produces a hormone and sends it to a target tissue.

Distinguish the 4 main functions of the endocrine glands by completing the graphic organizer below.

Functions of the Endocrine Glands
Main Idea

A Negative Feedback System

I found this information on page ________.

Details

Model a negative-feedback system by completing the cycle chart below.

Intestines take in ________ during ________.

[Diagram]

- ________ level decreases to normal level in bloodstream.
- ________ is restored.

- ________ is released into bloodstream, causing the ________ and other tissues to take up more ________.

- ________ responds to ________ level by producing the hormone ________.

- ________ level in ________ increases.

[Diagram]

A meal is eaten.

CONNECT IT

Draw an outline of the human body on a separate sheet of paper. Label it male or female. Using information provided in your book, show where endocrine glands are located and then describe their functions.

Name ___________________________ Date ______________

Section 1 The Endocrine System (continued)

Section 1 The Endocrine System (continued)
Predict three things that might be discussed in Section 2 as you read the headings.

1. 
2. 
3. 

Define cilia as it relates to this section.

cilia

Identify the vocabulary terms that match the definitions.

- male organ that produces sperm and testosterone
- male reproductive cells
- mixture of sperm and a fluid that helps sperm move and supplies the sperm with an energy source
- in humans, female reproductive organ that produces eggs
- monthly release of an egg from an ovary in a hormone-controlled process
- hollow, pear-shaped, muscular organ in which a fertilized egg develops
- monthly flow of blood and tissue cells that occurs when the lining of the uterus breaks down and is shed

Define adapt using its scientific meaning. Write a sentence that reflects this meaning.

adapt
Section 2 The Reproductive System (continued)

**Main Idea**

Reproduction and the Endocrine System

I found this information on page _________.

**Details**

Complete the graphic organizers below to differentiate the role of the pituitary gland in females and males.

- **Pituitary Gland in Females**
  - produces: ____________
  - stimulates: ____________

- **Pituitary Gland in Males**
  - produces: ____________
  - stimulates: ____________

Summarize information about the male reproductive organs in the graphic organizer below.

- **Male Reproductive Organs**
  - contains: ____________
  - make: ____________, ____________
Describe how the menstrual cycle would differ in phase 3 if the egg were fertilized. Then infer how future cycles would be affected.

**Connect It**

Describe how the menstrual cycle would differ in phase 3 if the egg were fertilized. Then infer how future cycles would be affected.

---

**Main Idea**

The Female Reproductive System

I found this information on page __________.

**Details**

Sequence the steps through which an egg moves in the female reproductive system.

![Diagram of egg movement in female reproductive system]

Analyze the phases of the menstrual cycle, and then complete the table below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td></td>
</tr>
<tr>
<td>Phase 2</td>
<td></td>
</tr>
<tr>
<td>Phase 3</td>
<td></td>
</tr>
<tr>
<td>(if fertilized egg does not arrive)</td>
<td></td>
</tr>
</tbody>
</table>
Human Regulation and Reproduction

Section 3 Human Life Stages

Benchmarks—SC.H.1.3.5: The student knows that a change in one or more variables may alter the outcome of an investigation. Also covers: SC.H.1.3.6, SC.H.1.3.7

Skim the headings in Section 3. Then write three questions that you have about the human life stages.

1. ____________________________________

2. ____________________________________

3. ____________________________________

Define nutrient to show its scientific meaning.

Define the new vocabulary terms to show their scientific meaning.

Define capable. Use capable in an original sentence to show its scientific meaning.
Sequence the events that result in the formation of a zygote by completing the following graphic organizer.

Sperm enter the vagina and come in contact with chemical secretions in the vagina.

Classify the following descriptions as applying to either identical twins or fraternal twins. Write either for a description that could fit both categories.

Two eggs are released and both are fertilized.

A fertilized zygote divides into two separate zygotes.

Twins of the same sex are born.

Twins with different sexes are born.

Create a time line to indicate when the following events occur: a) embryo forms; b) amniotic sac forms; c) head forms; d) fingers and toes form. Not all weeks will be filled in.
### Main Idea

**The Birthing Process**

I found this information on page ______.  

### Details

**Sequence** the events that occur during the birthing process. The first one has been completed for you.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Contractions increase.</td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

**Summarize** information about the stages after birth using the table below.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Period in Life</th>
<th>Changes That Occur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childhood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adolescence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adulthood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Older Adulthood</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Name _______________________________ Date ____________

Tie It Together

Synthesize It

Create a journal that reflects your own stages of development. Interview your parents to record information about your size at various ages (including birth weight and length) and when you learned certain skills such as the ability to crawl and walk, when you lost your baby teeth, and so on. Try to find pictures of yourself at various ages to include in your journal.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Human Regulation and Reproduction

Chapter Wrap-Up

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

1. Write an A if you agree with the statement.
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<thead>
<tr>
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SUMMARIZE IT

After reading this chapter, identify three things you have learned about human regulation and reproduction.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

174 Human Regulation and Reproduction
## Heredity

Sunshine State Standards—SC.F.2: The student understands the process and importance of genetic diversity.

### 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>Heredity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Offspring of an organism always have the same traits as the parents.</td>
</tr>
<tr>
<td></td>
<td>• There may be more than two forms of a gene.</td>
</tr>
<tr>
<td></td>
<td>• Some traits are determined by more than one gene.</td>
</tr>
<tr>
<td></td>
<td>• Traits from one type of organism can be introduced into another type of organism.</td>
</tr>
</tbody>
</table>

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

### Science Journal

*Write three traits that you have and how you would determine how those traits were passed to you.*

---

---

---

---

---

---

---

---

---

---


Name ____________________________ Date ____________

Heredity
Section 1 Genetics

Benchmarks—SC.F.2.3.2: The student knows that the variation in each species is due to the exchange and interaction of genetic information as it is passed from parent to offspring. Also covers: SC.H.1.3.1, SC.H.1.3.2, SC.H.1.3.4, SC.H.1.3.6, SC.H.2.3.1, SC.H.3.35

Skim Section 1 of the chapter. Write two questions that come to mind from reading the headings of this section.

1. ____________________________

2. ____________________________

Review Vocabulary

Define meiosis.

meiosis

______________________________

New Vocabulary

Write a paragraph describing heredity. Use the five vocabulary terms from the left in your paragraph.

heredity

______________________________

genetics

______________________________

allele

______________________________

dominant

______________________________

recessive

______________________________

Write a paragraph describing genotype. Use the five vocabulary terms from the left in your paragraph.

Punnett square

______________________________

genotype

______________________________

phenotype

______________________________

homozygous

______________________________

heterozygous

______________________________

Academic Vocabulary

Use a dictionary to define dominate.

dominate

______________________________
Summarize what alleles are and how they are inherited.

Identify three things Mendel did that made his work more useful than previous studies of heredity.

1. 
2. 
3. 

Analyze one trait that Mendel studied.

- Identify the dominant and recessive forms of the trait.
- Predict how an organism would look if it had two dominant alleles, two recessive alleles, or one of each allele.

<table>
<thead>
<tr>
<th>Trait</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominant form</td>
<td></td>
</tr>
<tr>
<td>Recessive form</td>
<td></td>
</tr>
<tr>
<td>Two dominant alleles</td>
<td></td>
</tr>
<tr>
<td>Two recessive alleles</td>
<td></td>
</tr>
<tr>
<td>One of each allele</td>
<td></td>
</tr>
</tbody>
</table>
Complete the Punnett square for black and blond fur in a dog.

<table>
<thead>
<tr>
<th></th>
<th>Black dog</th>
<th>Blond dog</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>b</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td></td>
</tr>
</tbody>
</table>

Analyze the Punnett square to complete the sentences.

The black dog carries ____________ black-fur traits. The blond dog carries ____________ blond-fur traits. The chance that the offspring will have black fur is ____________, or ____________ in ____________.

Summarize Mendel’s 3 principles of heredity.

1. _______________________________________________________________________

2. _______________________________________________________________________

3. _______________________________________________________________________

CONNECT IT A pea plant is heterozygous for purple flowers (Rr). A gardener crosses it with another pea plant with the same genotype. The recessive gene for this trait causes white flowers. Predict the possible genotypes and phenotypes for the offspring. Predict the percentage for each genotype and phenotype.

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________
Heredity
Section 2 Genetics Since Mendel

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

Scan the headings and illustrations in Section 2. Write two facts you learned about genetics as you scanned the section.

1. ____________________________________________
2. ____________________________________________

Review Vocabulary
Define gene to show its scientific meaning.

gene

New Vocabulary
Define each vocabulary term.
incomplete dominance

polygenic inheritance

sex-linked gene

Academic Vocabulary
Use a dictionary to define intermediate. Then rewrite the sentence below, using your definition.

When the allele for white four-o’clock flowers and the allele for red four-o’clock flowers combined, the result was an intermediate phenotype—pink flowers.

intermediate

Name _______________________________ Date ____________

Heredity 179
**Main Idea**

**Incomplete Dominance**

I found this information on page __________.

---

**Details**

**Draw** a Punnett square for red and white four-o’clock flowers showing the possible offspring. Use R for the allele for red flowers and R’ for the allele for white flowers. In each section of the square, write the genotype and phenotype of the offspring.

<table>
<thead>
<tr>
<th>Red four-o’clock</th>
<th>White four-o’clock</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>R’</td>
</tr>
<tr>
<td>R’</td>
<td>R’</td>
</tr>
</tbody>
</table>

**Summarize** incomplete dominance.

---

**Analyze** how a gene with multiple alleles can produce more than three phenotypes. Use blood types as an example.

---

**Identify** how internal environment can affect the expression of a trait. Complete the flow chart.

- **Gene for bright plumage is present.**
  - Male bird: Chemicals activate gene → Gene expressed.
  - Female bird: Chemicals activate gene → Gene expressed.
Analyze how chromosome disorders occur.

A chromosome disorder occurs as a result of a ______________________________. It causes an organism to have ______________________________ chromosomes than normal.

Model how two heterozygous parents who do not have a recessive disorder can have a child with the disorder. Use C for a dominant allele and c for a recessive allele.

**Mother’s genotype:** ______

**Father’s genotype:** ______

**Child’s genotype:** ______

Complete the statements about sex-linked traits.

Sex-linked disorders usually result from __________________ alleles on the ________ chromosome. A man will have the disorder when ______________________________. A woman will have the disorder when ______________________________.

Summarize why pedigrees are useful to geneticists.

______________________________

______________________________

SYNTHESIZE IT

Choose a trait described in Section 2, such as color-blindness, calico patterns in cats, or cystic fibrosis. Choose genotypes for two parents. Draw a pedigree starting with these parents. Continue your pedigree for two generations. Use Punnett squares to help you predict possible offspring.
Heredity
Section 3 Advances in Genetics

Benchmarks—SC.F.2.3.2: The student knows that the variation in each species is due to the exchange and interaction of genetic information as it is passed from parent to offspring. Also covers: SC.H.1.3.5, SC.H.3.3.4

Preview the section title and headings. Write three questions that you would ask a modern geneticist after your preview.

1. _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________

2. _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________

3. _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________

Review Vocabulary

**Define** DNA in an original sentence to show its scientific meaning.

DNA
   _____________________________________________________________
   _____________________________________________________________

New Vocabulary

**Define** genetic engineering.

genetic engineering
   _____________________________________________________________
   _____________________________________________________________

Academic Vocabulary

**Use a dictionary to define** insert as a verb. Then find a sentence in Section 3 that uses the term or a form of the term.

insert
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
Section 3 Advances in Genetics (continued)

Main Idea

**Genetic Engineering**

I found this information on page __________.

I found this information on page __________.

I found this information on page __________.

Details

**Distinguish** three uses for genetic engineering.

1. ______________________________________
2. ______________________________________
3. ______________________________________

**Organize** information about recombinant DNA. Complete the graphic organizer.

**Recombinant DNA**

Produced by:

Used for:

**Summarize** how gene therapy may be used in the future.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Create a flow chart about gene therapy. Show how the gene gets into the body and what happens when it reaches the cells.

Summarize each step of gene therapy in your model above.

1. ____________________________
2. ____________________________
3. ____________________________

Evaluate the benefits and potential risks of genetic engineering of crop plants.

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Describe how viruses are useful tools in genetic engineering.
Tie It Together

Suppose that Gregor Mendel came to visit a modern genetics laboratory and you were asked to give him a tour. Write a report describing what you would show him and how you would explain modern genetics. Remember that he does not know the words gene or allele, although he described “factors” that controlled traits.
Heredity  Chapter Wrap-Up

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

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

<table>
<thead>
<tr>
<th>Heredity</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Offspring of an organism always have the same traits as the parents.</td>
<td></td>
</tr>
<tr>
<td>• There may be more than two forms of a gene.</td>
<td></td>
</tr>
<tr>
<td>• Some traits are determined by more than one gene.</td>
<td></td>
</tr>
<tr>
<td>• Traits from one type of organism can be introduced into another</td>
<td></td>
</tr>
<tr>
<td>type of organism.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

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

SUMMARIZE IT

After reading this chapter, identify three things you have learned about heredity.

__________________________________________

__________________________________________

__________________________________________

__________________________________________

186  Heredity
Adaptations over Time

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>Adaptations over Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Traits acquired by an organism during its life can be passed on to its offspring.</td>
</tr>
<tr>
<td></td>
<td>• Most evidence of evolution comes from fossils.</td>
</tr>
<tr>
<td></td>
<td>• Organisms with traits best suited to their environment are more likely to survive and reproduce.</td>
</tr>
<tr>
<td></td>
<td>• Humans share a common ancestor with other primates.</td>
</tr>
</tbody>
</table>

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

Science Journal

Pick a favorite plant or animal and list all the ways it is well-suited to its environment.
Adaptations over Time
Section 1 Ideas About Evolution

**Predict** three things that will be discussed in Section 1 as you scan the headings and illustrations.

1. 
2. 
3. 

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

- gene

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

- group of organisms that share similar characteristics and can reproduce among themselves, producing fertile offspring
- change in inherited characteristics over time
- process by which organisms with traits best suited to their environment are more likely to survive and reproduce
- inherited trait that makes an individual different from other members of its species
- any variation that makes an organism better suited to its environment

**Use a dictionary to define** hypothesis.

- hypothesis
Section 1  Ideas About Evolution (continued)

Main Idea

Early Models of Evolution

I found this information on page _________.

Darwin’s Model of Evolution

I found this information on page _________.

Natural Selection

I found this information on page _________.

Variation and Adaptation

I found this information on page _________.

Details

Identify why Lamarck’s theory of evolution was not accepted.

__________________________

__________________________

__________________________

Analyze Darwin’s explanation of the origins of the 13 species of Galápagos finches. Fill in the missing words.

The Galápagos finches ___________ for food. Those that had ___________ and ___________ that allowed them to get food were able to ___________ longer and ___________ more.

Over time, groups of finches became separate ___________.

State the 5 main principles of natural selection.

1. _______________________

2. _______________________

3. _______________________

4. _______________________

5. _______________________

Compare and contrast variations and adaptations.

<table>
<thead>
<tr>
<th>Variation</th>
<th>Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td></td>
</tr>
<tr>
<td>Examples</td>
<td></td>
</tr>
</tbody>
</table>
Complete the table explaining factors that can lead to changes in a population.

<table>
<thead>
<tr>
<th>What Happens</th>
<th>How It Leads to Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in gene sources</td>
<td></td>
</tr>
<tr>
<td>Geographic isolation</td>
<td></td>
</tr>
</tbody>
</table>

Compare and contrast gradualism and punctuated equilibrium. Select ideas from your reading to fill in the Venn diagram.

**SYNTHESIZE IT**

Describe how natural selection can lead to the formation of a new species. Include factors such as migration and geographic isolation.
Adaptations over Time
Section 2 Clues About Evolution

Scan Section 2 of your book. Write two items in each of the boxes below.

<table>
<thead>
<tr>
<th>What I know about fossils</th>
<th>What I want to know about fossils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Define epoch to show its scientific meaning.

epoch

Write the correct vocabulary term next to each definition.

- a type of rock made from pieces of other rocks, minerals deposited from a solution, or plant and animal matter
- element that gives off a steady amount of radiation as it slowly changes to a nonradioactive element
- study of embryos and their development
- similar in structure, origin, or function
- structure that does not seem to have a function and that may once have functioned in the body of an ancestor

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

method
Main Idea

Clues from Fossils

Create a concept map to summarize information about the Green River formation. Include information about
• where it is located
• where it was located in the past
• how fossils formed
• what scientists learn from the fossils there.

Details

Types of Fossils

Summarize the types of rock in which fossils are commonly found.

Most fossils are found in ____________ rock. They are most often found in ____________.

Determining a Fossil’s Age

Organize information about how scientists determine the age of fossils. Complete the outline.

I. Relative dating

A. ____________

B. provides an estimate of a fossil’s age by ____________

II. Radiometric dating

A. ____________

B. Scientists estimate age by ____________
Complete the graphic organizer to identify what scientists learn from fossils.

More Clues About Evolution

Organize information about other clues scientists use to study evolution.

A scientist discovers a new species of mammal. How could the scientist determine its evolutionary relationships to other animals? Explain how the scientist could use each type of evidence discussed in the section.
Adaptations over Time
Section 3  The Evolution of Primates

Benchmarks—SC.F.2.3.4: The student knows that the fossil record provides evidence that changes in the kinds of plants and animals in the environment have been occurring over time. Also covers: SC.G.1.3.1, SC.G.1.3.2, SC.G.1.3.3, SC.H.1.3.3, SC.H.1.3.5, SC.H.1.3.6, SC.H.1.3.7, SC.H.3.3.5

Skim Section 3 of your book. Read the headings. Write three questions that come to mind.
1. 
2. 
3. 

Review Vocabulary
Define opposable to show its scientific meaning.

opposable

New Vocabulary
Define the following terms. Then use each term in a sentence.

primates

hominid

Homo sapiens

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

**Primates**

I found this information on page _________.

### Details

**Analyze** adaptations that are common among primates by completing the table below. List three primate adaptations and the functions each allows.

<table>
<thead>
<tr>
<th>Adaptation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Distinguish** the 3 main characteristics of hominids.

1. __________________________________________
2. __________________________________________
3. __________________________________________

**Sequence** the ancestors of early humans. Create a time line of hominids in the boxes below. Identify and describe the hominid that lived during each time period.

**Time period:** 4 million to 6 million years ago
**Hominid:**
**Characteristics:**

**Time period:** 1.5 million to 2 million years ago
**Hominid:**
**Characteristics:**

**Time period:** 1.6 million years ago
**Hominid:**
**Characteristics:**
Organize information about the origins of modern humans.

Early Homo sapiens
(about 400,000 years ago)

_________ about __________ years ago

_________ about __________ years ago

(Homo sapiens sapiens)

Contrast Neanderthals and Cro-Magnon humans by completing the diagram.

Neanderthals

Cro-Magnon humans

CONNECT IT

Hypothesize how scientists might determine whether Neanderthals are ancestors of modern humans.

Name ___________________________________________ Date ____________

Section 3 The Evolution of Primates (continued)
Tie It Together

Make Fossils

*With a partner, model a set of fossils that show how organisms can change over time. Draw or model three related organisms. One should be the original organism. The others should be descendants of the original organism. Record the adaptations shown by your fossils. What environmental changes might have led to the adaptations?*

*Trade fossils with another pair. Describe the fossils that you are given. What adaptations can you find?*
Adaptations over Time  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>Adaptations over Time</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Traits acquired by an organism during its life can be passed on to its offspring.</td>
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</tr>
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<td>• Most evidence of evolution comes from fossils.</td>
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</tr>
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<td>• Humans share a common ancestor with other primates.</td>
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</tbody>
</table>

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

Summarize It

After reading the chapter, identify three things you have learned about adaptations of organisms over time.
Interactions of Living Things

Sunshine State Standards—SC.G.1: The student understands the competitive, interdependent, cyclic nature of living things. Also covers: SC.B.1, SC.G.2, SC.H.2

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>Interactions of Living Things</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Both living and nonliving factors affect the organisms in an ecosystem.</td>
<td></td>
</tr>
<tr>
<td>• Some environments have no limiting factors.</td>
<td></td>
</tr>
<tr>
<td>• Organisms interact only with other members of their species.</td>
<td></td>
</tr>
<tr>
<td>• Energy flows from an organism that is being eaten to the organism that is eating.</td>
<td></td>
</tr>
</tbody>
</table>

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

**Science Journal**

Write a list of things you interact with each day.

__________________________

__________________________

__________________________

__________________________

__________________________

__________________________

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

1. 
2. 
3. 

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

climate

**Review Vocabulary**

Use your book to identify the terms. Write the correct term in front of its definition.

- study of all of the interactions among organisms and their environment
- nonliving part of the environment
- living part of the environment
- all members of one species that live in the same area at the same time
- group of populations that interact with one another in a given area
- the biotic community in a given area and the abiotic factors that affect it
- part of Earth that supports life—the top part of Earth’s crust, all of the waters covering Earth’s surface, and the surrounding atmosphere

**New Vocabulary**

**Academic Vocabulary**

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

interact
**Main Idea**

**Ecology**

*I found this information on page __________.*

**Abiotic Factors**

*I found this information on page __________.*

## Details

**Organize** *the factors in the environment that influence organisms by completing the graphic organizer below.*

<table>
<thead>
<tr>
<th>Factors in the Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>nonliving</td>
</tr>
</tbody>
</table>

**Summarize** *why the 5 abiotic factors are important to organisms in a particular environment.*

<table>
<thead>
<tr>
<th>Abiotic Factor</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>All living things need water to survive. The bodies of most organisms are 50–95 percent water. Many important life processes need water in order to occur.</td>
</tr>
<tr>
<td>Sunlight</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>Nutrients, minerals, and moisture in soil determine what plants grow in an area. The types of plants in an area help determine which other organisms live there.</td>
</tr>
</tbody>
</table>
Main Idea

Biotic Factors

I found this information on page __________.

Details

Identify three things that organisms depend on one another for.

Organisms Depend on Other Organisms for

Sequence from smallest to largest the levels of organization in which organisms interact with one another and with abiotic factors.

Smallest

Largest

SYNTHESIZE IT

The living world also can be organized into smaller levels. Working backwards from organism, describe four smaller levels arranged from largest to smallest.
Interactions of Living Things
Section 2 Interactions Among Living Organisms

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

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

1. ____________________________
2. ____________________________
3. ____________________________

Define coexistence to show its scientific meaning.

coexistence

______________________________

______________________________

New Vocabulary

Use your book to identify the correct terms. Write them in the spaces provided.

______________________________
number of individuals in a population that occupy a definite area

______________________________
any biotic or abiotic factor that limits the number of individuals in a population

______________________________
any close interaction among two or more different species

______________________________
role of an organism in the ecosystem: including what it eats, how it interacts with other organisms, and how it gets its food

______________________________
place where an organism lives

Academic Vocabulary

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

regulate

______________________________
Organize information about the characteristics of populations. Fill in the definitions in the graphic organizer.

**Characteristics of Populations**

- **Size**
- **Density**
- **Spacing**

**Term** | **Description**
--- | ---
Limiting factor | 
Carrying capacity | 

**Compare** the terms limiting factor and carrying capacity.

**Define** biotic potential by filling in the missing terms.

Biotic potential: The ____________ rate at which a population _______________ when there are no ________________ or enemies, there is plenty of food and ________________, and the weather is ideal.
Section 2  Interactions Among Living Organisms (continued)

Main Idea

Symbiosis and Other Interactions

I found this information on page ____________.

Details

Distinguish the types of symbiotic relationships by completing the table below.

<table>
<thead>
<tr>
<th>Symbiotic Relationship</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both organisms benefit.</td>
<td></td>
</tr>
<tr>
<td>Commensalism</td>
<td></td>
</tr>
<tr>
<td>One organism benefits and the other is harmed.</td>
<td></td>
</tr>
</tbody>
</table>

Analyze how predators may cause a prey population to grow more healthy and stronger over several generations.

Summarize the difference between a habitat and a niche.

SYNTHESIZE IT

Compare disease with predation as a limiting factor for human populations.

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Interactions of Living Things
Section 3 Matter and Energy

Scan the headings and illustrations of Section 3 to identify two cycles that will be discussed.

1. ________________________________

2. ________________________________

Define consumer to show its scientific meaning. Then write a sentence using the term.

consumer

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

food chain

food web

water cycle

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

transfer
Complete a pond food chain such as the one shown in your book. Then describe what the arrows in the food chain show.

Aquatic plants → Insects → _______ → _______ → _______

Define what a food web is and summarize why it is a more complete model than a food chain.

Identify organisms for each level of an ecological pyramid. Write the name of the organism inside the correct level of the pyramid. Then, label each level as consisting of producers or consumers.
Complete the organizer about water cycle processes.

Water Cycle Processes

- Condensation
  - Process in which a liquid changes to a gas

Model the carbon cycle in the space below. Draw a picture that shows how carbon moves among the atmosphere, organisms, and solid Earth.

Connect It

Describe two ways in which you are a part of the carbon cycle.

Name ____________________________ Date ____________

Section 3 Matter and Energy (continued)

The Cycles of Matter

I found this information on page _________.

I found this information on page _________.

Interactions of Living Things

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Tie It Together

Synthesize It

Create a food web.

1. Make a list of foods that you ate yesterday.
2. Determine whether the main component of each food was a producer or a consumer.
3. For each consumer, identify at least one food that it ate.
4. Then, create a food web that includes yourself.
Interactions of Living Things
Chapter Wrap-Up

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

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

<table>
<thead>
<tr>
<th>Interactions of Living Things</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
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<td>• Both living and nonliving factors affect the organisms in an ecosystem.</td>
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☐ Look over the Chapter Review at the end of the chapter.

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

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Oceanography

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.

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

Define the following terms.

abyssal plain

mid-ocean ridge

trench

Use a dictionary to find the scientific definition of derive.

derive
Main Idea

The Ocean Basins

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.

Continental Shelf

Both

Continental Slope
**Main Idea**

**Ridges and Trenches**

I found this information on page ________.

**Details**

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

- **At Mid-Ocean Ridges**
  - new ocean floor forms

- **At Subduction Zones**
  - seafloor is destroyed

**Mineral Resources from the Seafloor**

I found this information on page ________.

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

**CONNECT IT**

Infer why retrieving resources from deep water is such a challenge.
Oceanography
Section 2 Life in the Ocean

**Benchmarks—SC.D.1.3.2:** The student knows that over the whole Earth, organisms are growing, dying, and decaying as new organisms are produced by the old ones. Also covers: SC.A.1.3.1, SC.B.1.3.3, SC.D.1.3.3, SC.F.1.3.1, SC.F.2.1.3, SC.G.1.3.4, SC.G.1.3.5, SC.G.2.3.2, SC.H.1.3.6

**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

**New Vocabulary**

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

estuary

reef

**Academic Vocabulary**

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

undergo
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 types of plants and animals that live in the ocean. Complete the graphic organizer below to organize the types, include descriptions and examples of each type.
Section 2 Life in the Ocean (continued)

**Main Idea**

**Ocean Margin Habitats**

*I found this information on page __________.*

**Details**

**Compare and contrast** ocean margin habitats. Identify 4 margin habitats and at least four examples of organisms that live in each one. Make a sketch of each habitat to help you remember.

<table>
<thead>
<tr>
<th>1. __________</th>
<th>2. __________</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. __________</td>
<td>4. __________</td>
</tr>
</tbody>
</table>

**SYNTHESIZE IT**

Compare and contrast food webs that rely on chemosynthesis with food webs that depend on photosynthesis.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Oceanography
Section 3 Ocean Pollution

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.
runoff
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

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

Use a dictionary to define phenomenon using its scientific meaning.
phenomenon
____________________________________________________________________
____________________________________________________________________
Section 3  Ocean Pollution (continued)

Complete the graphic organizer to identify five types of ocean pollution and their causes or sources.

I found this information on page _________.

<table>
<thead>
<tr>
<th>Types of Ocean Pollution</th>
<th>Causes of Ocean Pollution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.
Oceanography Chapter Wrap-Up

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

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

<table>
<thead>
<tr>
<th>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 you have learned about oceanography.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Resources

Before You Read

Before you read the chapter, respond to these statements.

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

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• In the United States, electrical power plants burn fossil fuels to provide energy for most homes and factories.</td>
</tr>
<tr>
<td></td>
<td>• There is an unlimited supply of fossil fuels.</td>
</tr>
<tr>
<td></td>
<td>• Sun and wind are nonpolluting alternative energy resources.</td>
</tr>
<tr>
<td></td>
<td>• Less than one percent of Earth’s water is freshwater available for human use.</td>
</tr>
</tbody>
</table>

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

Where does the energy used to run farm equipment come from?
Predict 3 things that might be discussed based on the title of the section.

1. 

2. 

3. 

Define geologist.

geologist


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

fossil fuel

pollution

acid rain

nonrenewable

Use your book or a dictionary to define resource.

resource
Sequence the steps in the formation of coal.

1. 
2. Microorganisms change the dead plant matter into peat.
3. 
4. 
5. 

Model oil and natural gas deposits in rock layers by drawing and labeling a diagram. Use the figure in your book to help you.

Analyze how hydrocarbons get trapped below the surface.
Pollution and Fossil Fuels

Organize information about how burning fossil fuels contributes to pollution in the concept map.

Burning fossil fuels

releases

made of

made of

made of

Are fossil fuels running out?

Analyze the information in the graph titled “Reserves of Coal, Oil, and Natural Gas.” List the fossil fuels in the order in which they will probably be used up. Also write how many years it will probably be before the supply is depleted.

1. ____________________________
2. ____________________________
3. ____________________________

SYNTHESIZE IT

Suggest types of transportation that people could use to help reduce the use of fossil fuels.

__________________________
__________________________
__________________________

Resource

Section 2 Alternative Energy Resources

Benchmarks—SC.D.2.3.2: knows the positive and negative consequences of human action on the Earth’s systems.
Also covers: SC.A.2.3.3, SC.B.1.3.1, SC.D.2.3.1, SC.G.2.3.1, SC.G.2.3.4, SC.H.1.3.5, SC.H.3.3.4

**Skim** through Section 2 of your book. Write three questions that come to mind after reading the headings.

1. __________________________________________
2. __________________________________________
3. __________________________________________

**Define** technology.

technology

**Use the following key terms in original scientific sentences that show their scientific meaning.**

solar energy

hydroelectric power

geothermal energy

nuclear energy

**Use a dictionary to define source.**

source
Section 2  Alternative Energy Resources (continued)

Main Idea

Other Sources of Energy
I found this information on page ________.

Solar Energy
I found this information on page ________.

Energy from Wind
I found this information on page ________.

Details

Identify four sources of renewable energy.
1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________

Label the blanks in the flowchart to trace the energy changes that take place in a solar cell.

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

Wind Energy as a Source of Electricity

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 2 Alternative Energy Resources (continued)

**Main Idea**

**Hydroelectric Power**

*Identify which alternative energy resource you think could best serve your community, and why you believe this is so.*

**Details**

Model *a hydroelectric power plant. Use your book to help you.*

**Energy from Earth**

*Identify two problems associated with geothermal power.*

1. 

2. 

**Nuclear Energy**

*Sequence the steps in a nuclear chain reaction.*

1. 

2. 

3. 

**CONNECT IT**

Identify which alternative energy resource you think could best serve your community, and why you believe this is so.
Scan Section 3 of your book using the checklist below.

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

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

1. __________________________________________
2. __________________________________________
3. __________________________________________

Define microorganisms in a sentence that shows its scientific meaning.

microorganisms

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

pollution that comes from a single, identifiable source

water that soaks into the ground and collects in small spaces between bits of rock and soil

pollution that cannot be traced back to an exact location

Use a dictionary to define available.

available
Main Idea

Water—A Vital Resource

I found this information on page __________.

Details

Create a cycle map in the space below showing the processes of the water cycle. Include the terms condensation, precipitation, evaporation, and runoff and groundwater in your flowchart.

Groundwater

I found this information on page __________.

Skim the Groundwater section. In the Question spaces, rewrite the bold headings as questions. Then answer your questions.

Groundwater

Question: ______________________________________
Answer: ______________________________________

Surface Water

Question: ______________________________________
Answer: ______________________________________

Water Use

Question: ______________________________________
Answer: ______________________________________
Section 3 Water (continued)

Main Idea

Water Pollution

Organize information about sources and examples of water pollution.

<table>
<thead>
<tr>
<th>Type of Pollution</th>
<th>What is it?</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point source pollution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonpoint source pollution</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cleaning Up Water

Sequence 4 steps used to clean water at a water purification plant.

1. 
2. 
3. 
4. 

Summarize It

Describe four ways that clean, fresh water is important to your daily life.

1. 
2. 
3. 
4. 

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Predict three things that might be discussed in this section based on the headings that appear in it.

1. 
2. 
3. 

Define habitat in a scientific sentence.

I found this information on page ______.

Land as a Resource

Identify four reasons land is an important resource.
Analyze information from your book to identify the effects that forests have on carbon dioxide in the atmosphere.

I found this information on page __________.

Resources from Land

Forest Conservation

Compare trees with forests. Describe why trees can be considered renewable resources, but some forests are considered nonrenewable resources.

I found this information on page __________.
Organize information from your book about ores and mining.

<table>
<thead>
<tr>
<th>Ores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
</tr>
<tr>
<td>Ore is</td>
</tr>
</tbody>
</table>

Analyze how the way one resource is used can impact another resource. Give at least three ways.

1. 

2. 

3. 

Give three examples of how land is important in your life.

[Blank lines for three examples]
Resources  Chapter Wrap-Up

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

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**Summarize It**

After reading this chapter, identify three things that you have learned about resources.
abiotic  an environmental factor not associated with the activities of living organisms
acceleration  rate of change in velocity, usually expressed in meters per second; involves an increase or decrease in speed and/or a change in direction
air resistance  force of air on moving objects
allele  any of two or more alternate forms of a gene that an organism may have for a particular trait
amplitude  in any periodic function (e.g., a wave) the maximum absolute variation of the function
asexual reproduction  a form of reproduction in which new individuals are formed without the involvement of gametes
biodiversity  the existence of a wide range of different species in a given area or specific period of time
biotic  factors in an environment relating to, caused by, or produced by living organisms
calorie  unit of energy; the amount of heat needed to raise one gram of water one degree Celsius at standard atmospheric pressure
chemical weathering  the breakdown and alteration of rocks at or near Earth’s surface as a result of chemical processes
circuit  an interconnection of electrical elements forming a complete path for the flow of current
conduction  the transmission of heat through a medium and without the motion of the medium
conservation of energy  a fundamental principle stating energy cannot be created nor destroyed but only changed from one form to another
convection  heat transfer in a gas or liquid by the circulation of currents from one region to another
crest  the peak or highest point on a wave
crust  outermost layer of Earth covering the mantle
dependent variable  factor being measured or observed in an experiment
deposition  the process by which sediment is carried by forces (e.g., wind, rain, or water currents) and left in a certain area
dominance  tendency of certain (dominant) alleles to mask the expression of their corresponding (recessive) alleles
ecosystem  an ecological community, together with its environment, functioning as a unit
efficiency  the relative effectiveness of a system or device determined by comparing input and output
electromagnetic radiation  the emission and propagation of the entire range of electromagnetic spectrum including: gamma rays, x-rays, ultraviolet radiation, visible light, microwaves, and radio waves
electron  a stable elementary particle that is negatively charged and orbits the nucleus of an atom
entropy  a measure of randomness or disorder of a closed system
erosion  a combination of natural processes in which materials from Earth’s surface are loosened, dissolved, or worn away and transported from one place to another
fossil fuels  the remains of animal or plant life from past geologic ages that are now in a form suitable for use as a fuel (e.g., oil, coal, or natural gas)
frequency  the number of cycles or waves per unit time
gene  a specific part of a chromosome or sequence of DNA that determines a particular feature or characteristic in an organism
heterozygous  cell or organism that has two different alleles for a particular trait
homozygous  cell or organism that has identical rather than different alleles for a particular trait
independent variable  the factor that is changed in an experiment in order to study changes in the dependent variable
inertia  the property of an object, due to its mass, by which it resists any change in its position unless overcome by force

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magnetic field  the region where magnetic force exists around magnets or electric currents
mass  the amount of matter an object contains
meiosis  the process of nuclear division in cells during which the number of chromosomes is reduced by half
mitosis  a process of nuclear division in eukaryotic cells during which the nucleus of a cell divides into two nuclei, each with the same number of chromosomes
neap tide  a twice-monthly tide of minimal range that occurs when the Sun, Moon, and Earth are at right angles to each other, thus decreasing the total tidal force exerted on Earth
neutral  a particle, object, or system that lacks a net charge
neutron  a subatomic particle having zero charge, found in the nucleus of an atom
nucleus  the center region of an atom where protons and neutrons are located; also a cell structure that contains the cell’s genetic material
ocean basin  a depression on the surface of Earth occupied by water
plate tectonics  theory of global dynamics in which Earth’s crust is divided into a smaller number of large, rigid plates whose movements cause seismic activity along their borders
potential energy  energy stored in an object due to the object’s configuration and position
pressure  the force exerted per unit area
prism  a piece of glass with polished plane surfaces that disperses a beam of white light into its component colors
proton  a subatomic particle having a positive charge and which is found in the nucleus of an atom
Punnett square  a graphic checkboard used to determine results from a particular genetic cross
recessive  an allele for a trait that will be masked unless the organism is homozygous for this trait
screw  a type of simple machine that consists of an inclined plane wrapped around a cylinder
sexual reproduction  reproduction involving the union of gametes producing an offspring with traits from both parents
spectroscope  an instrument that uses a prism to separate and catalog light wavelengths
speed  amount of distance traveled divided by time taken; the time-rate at which any physical process takes place
spring tide  the tide of increased range that occurs twice monthly at the new and full phases of the Moon
thermal energy  internal energy found by adding the kinetic energy of particles making up a substance
tropism  the motion of an organism or part of an organism toward or away from an external stimulus
trough  the lowest point on a wave
variable  an event, condition, or factor that can be changed or controlled in order to study or test a hypothesis in a scientific experiment
velocity  the time-rate at which a body changes its position; defined as displacement divided by the time of travel
vibration  a repetitive movement around an equilibrium point
virus  a noncellular, disease-causing particle that uses the genetic material from its host to reproduce
wavelength  the distance between crests of a wave
wedge  a type of simple machine that consists of an inclined plane used to separate two objects
wheel and axle  a type of simple machine that consists of a rod driven through the center of a cylinder that is allowed to rotate freely, yielding a mechanical advantage equal to the cylinder’s diameter
| **accurate**: free from error; close to the correct amount |
| **achieve**: to gain, accomplish, attain, reach |
| **adapt**: to change to fit new conditions; to change in order to make suitable |
| **adjacent**: near, close, or adjoining |
| **adjust**: to arrange the parts of something to make it work correctly |
| **adult**: fully developed; grown |
| **affect**: to bring about a change in |
| **apparent**: appearing to be but not necessarily so, seeming; readily seen, visible, readily understood or perceived; evident; obvious |
| **approach**: to come near |
| **available**: ready to use |
| **capable**: able to do things; fit |
| **category**: group or class of things; a division in a classification system |
| **chart**: a sheet that gives information about something in the form of a diagram, graph, or table |
| **chemical**: any substance used in or obtained by a chemical process |
| **code**: (noun) set of signals representing letters or numerals, used to send messages; (verb) to put in the form of symbols of a code |
| **collapse**: to fall together, shrink |
| **communicate**: to make known or give information |
| **compensate**: to make up for |
| **component**: part of a machine or system |
| **compound**: made up of individual parts; made of two or more separate parts or elements |
| **concentrate**: to bring or come close together in one place |
| **constant**: not changing; continuing |
| **contact**: the act or state of touching or meeting |
| **contract**: to draw together; shrink in size |
| **controversy**: argument or debate |
| **convert**: to change from one form or use to another; to alter the physical or chemical nature or properties of |
| **coordinate**: to cause to work well together |
| **cycle**: a repeating sequence of events |
| **decline**: to become less in health, power, value, or number |
| **definite**: clear; without doubt |
| **derive**: to get or receive from a source |
| **device**: tool or instrument designed for a particular purpose |
| **differentiate**: to tell or see the difference |
| **displace**: to take the place of or remove from the usual or proper place |
| **dominate**: to have a command place; to exert mastery control, or preeminence; to control or rule |
| **eliminate**: to get rid of |
| **emerge**: to come out; to appear |
| **enable**: to make possible; to make able; to give means or power to |
| **encounter**: to meet or experience |
| **enormous**: having great size |
erode: to wear away
estimate: (noun) an opinion of the value, quality, size, or cost of something; (verb) to form an opinion by reasoning
evaluate: to determine the significance of something
exclude: to restrict or stop the entrance of
expand: to get bigger
external: positioned outside; beyond
extract: to take, get, or pull out
factor: a substance that functions in a body system
feature: part, appearance, or characteristic of something
function: (noun) a specific job or purpose; (verb) to carry out a specific action
fundamental: original or basic
goal: objective or end that one strives to achieve
hierarchy: a ranked series or order
hypothesis: something that is suggested as being true for the purposes of argument or of further investigation
identical: exactly the same; same as
impact: a strong, immediate effect
indicate: to make known or show; to be or give a sign of; to point out
individual: being or characteristic of a single thing
initial: of or relating to the beginning; first
insert: to put or fit (something) into something else
interact: to act upon one another; to influence one another

intermediate: in the middle or being between
internal: of or on the inside
interval: space or time between things
investigate: to search into something in order to learn the facts
item: object or thing
layer: one thickness of something over another, horizon
likewise: in the same way
mechanism: part or piece of machinery
medium: substance through which a force or effect is transmitted
method: particular procedure, technique, or way to do something; a process
neutral: neither negative nor positive
normal: conforming to a type, standard, or regular pattern
nuclear: of or relating to the atomic nucleus
obtain: to get through effort; gain
occur: to happen; to take place
overlap: one thing extends over another
parallel: everywhere the same distance apart
passive: induced by an outside agent
perceive: to observe or become aware of through the senses
percent: in, to, or for every one hundred
period: a repeating interval; row of the periodic table
phenomenon: any fact, condition, or happening that can be seen, heard, etc. and described in a scientific way
positive: real and numerically greater than zero

predict: to tell what one thinks will happen in the future; to foretell in advance on the basis of observation, experience, or scientific reason

principle: basic generalization that is accepted as true and that can be used as a basis for reasoning

process: series of changes by which something develops; series of changes that leads to a result

promote: to contribute to the growth of; to help bring into being

random: haphazard course; without definite aim, direction, rule, or method; lacking a definite plan, purpose, or pattern

ratio: relation of one thing to another in size or amount

react: to act because something has happened; to respond

recover: to get back something that has been lost

refine: to separate from impurities

regulate: to control according to rules or a system

reject: to refuse to accept or use

release: to set free; to let go

require: to be in need of

resource: something that lies ready for use or that can be drawn on for aid or to take care of a need

respond: to react to a stimulus

reveal: to make known; to show or display

rigid: not bending or moving; stiff and hard

section: one of several parts that together make up a whole

sequence: series; an order of events; one thing following another in a fixed order

series: a number of similar things coming one after another

significant: important; having meaning or effect

similar: having many but not all qualities in common; almost, but not exactly the same

source: that from which something comes into existence, develops, or derives; a thing or place from which something comes or is obtained

sphere: a round body, such as a ball, on which all points are the same distance from the center

stable: firmly established; not changing or fluctuating; not easily moved or changed

strategy: plan, scheme, or system

structure: arrangement of parts or the way parts are arranged

survey: to look at or study in detail

symbol: something that represents something else

technology: use of science for practical reasons, especially in engineering and industry

temporary: not permanent or lasting

theory: explanation of things or events based on scientific knowledge resulting from many observations and experiments; a group of ideas or principles that explain why or how something happens

transfer: to carry or send from one person, place, or position to another
transform: to change the condition, nature, or function of; to convert

transport: to carry from one place to another

trend: a general movement or tendency

undergo: to go through; have happen to one

underlie: to lie beneath

unique: being the only one; unusual; remarkable

vary: to change; to make or become different

version: variant of an original

visible: able to be seen; perceptible with the eye

voluntary: acting, done, or given of one’s own free will; by choice

widespread: widely scattered or prevalent