Science Notebook

Active Reading Note-taking Guide
Science Grade 8

Consultant
Douglas Fisher, Ph.D.
About the Consultant

Douglas Fisher, Ph.D., is a Professor in the Department of Teacher Education at San Diego State University. He is the recipient of an International Reading Association Celebrate Literacy Award as well as a Christa McAuliffe award for Excellence in Teacher Education. He has published numerous articles on reading and literacy, differentiated instruction, and curriculum design as well as books, such as Improving Adolescent Literacy: Strategies at Work and Responsive Curriculum Design in Secondary Schools: Meeting the Diverse Needs of Students. He has taught a variety of courses in SDSU’s teacher-credentialing program as well as graduate-level courses on English language development and literacy. He also has taught classes in English, writing, and literacy development to secondary school students.
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*Science Grade 8*
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.
Using Your Science Notebook

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 chapter and identify what you would like to learn from reading.

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

**Summarize It**
Each note-taking page ends with an activity that asks you to reflect on your notes and identify key concepts.

**Vocabulary Development**
Each lesson begins with vocabulary words that you will use as you study it. Academic Vocabulary helps you to score higher on standardized tests.
Motion

Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about motion in the first column. Then list three things that you would like to learn about motion in the second column.

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

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

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

Science Journal

Write a short description of how the motion of the racers might change from the start of the race to the finish line.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</tbody>
</table>
Grade 8 Science Content Standards—1.a: Students know position is defined in relation to some choice of a standard reference point and a set of reference directions.

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

- Read all of the headings.
- Read all of the bold words.
- Look at the charts, graphs, and pictures.
- Think about what you already know about determining position.

Write three things that you learn about determining position.

1. 
2. 
3. 

Define distance.

distance

Write a paragraph, using all of the vocabulary terms.

reference point

displacement

vector

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

dimension
Lesson 1  Determining Position (continued)

Main Idea

Position and reference point
I found this information on page ________.

Details

Identify three pieces of information needed to describe an object’s position.
1. ____________________________
2. ____________________________
3. ____________________________

Summarize how + and – signs are used to show direction.

Organize information about vectors. Complete the diagram.

A vector is described by

Position in Two Dimensions
I found this information on page ________.

Analyze why a map uses two reference directions to describe position.

Summarize the main ideas of the above sections in three bullet points.

Summarize IT

Name ____________________________ Date ____________

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Position in Two Dimensions

Model how to locate a position using two reference directions. Label the x-axis, y-axis, and origin. Then put a dot at the position that is 20 m east and 10 m north of the origin. Each mark on the axes represents 10 m.

Contrast distance and displacement. Draw a diagram to show distance and displacement for a person moving halfway around a park. Label the distance and displacement.
Motion
Lesson 2  Speed, Velocity, and Acceleration

Grade 8 Science Content Standards—1.c: Students know how to solve problems involving distance, time, and average speed. Also covers: 1.b, 1.d, 1.e

**Skim the headings in Lesson 2 of your book. Identify four topics that will be discussed.**

1. 
2. 
3. 
4. 

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

rate

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

**speed**

**constant speed**

**instantaneous speed**

**average speed**

**velocity**

**acceleration**

**Define constant, using a dictionary.**

constant
Lesson 2  Speed, Velocity, and Acceleration (continued)

**Main Idea**

What is speed?
I found this information on page ___________.

What is average speed?
I found this information on page ___________.

**Details**

Create a graphic organizer to contrast constant speed and changing speed. Include at least four facts.

[Blank graphic organizer]

Summarize how to calculate average speed. Complete the formula with words. Then write it in symbols, and identify the unit used to measure speed.

average speed = ______ = ______

Unit: __________________________

Analyze how to use the equation for average speed to find distance and time. Write the equation you could solve to find each.

Distance: _____ = _____

Time: _____ = _____

**SUMMARIZE IT**

Summarize two main ideas of the above sections.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Lesson 2  Speed, Velocity, and Acceleration (continued)

**Main Idea**

**Velocity**

`I found this information on page _________.`

**Details**

**Compare and contrast** speed and velocity by using the phrases listed to fill in the Venn diagram.

- describes a rate
- includes direction
- is a vector
- describes how fast an object moves
- includes distance
- includes time
- is not a vector

**Acceleration**

`I found this information on page _________.`

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

**Summarize It**

Summarize the main ideas of the above sections in two bullet points.

---

**Motion** 7
Motion
Lesson 3 Graphing Motion

Grade 8 Science Content Standards—1.f: Students know how to interpret graphs of position versus time and graphs of speed versus time for motion in a single direction. Also covers: 9.d, 9.e

Skim Lesson 3 of your book. Write three questions that come to mind. Look for answers to your questions as you read the lesson.

1. 
2. 
3. 

Define linear.

linear

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

slope

rise

run

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

similar
Create a position-time graph. Use the data in the table in your book to sketch and label a graph.

Complete the sentence to show how speed is related to the slope of a position-time graph.

The ____________ the slope of a position-time graph, the ____________ the speed.

Model how to calculate the slope of a position-time graph. Label the rise and run on the graph below. Then write the equation for determining slope.

Summarize two main ideas of the above section.
Main Idea

**Position-Time Graphs**

I found this information on page __________.

**Details**

**Summarize** the relationship between average speed and the slope of a position-time graph. Then explain how to find the average speed of an object with changing speed.

---

**Speed-Time Graphs**

I found this information on page __________.

**Details**

Analyze the speed-time graph below. Label the axes and parts of the graph with the labels listed.

- Speed (m/s)  - constant speed  - increasing speed
- Time (s)     - decreasing speed

**Distinguish** between the lines for constant, increasing, and decreasing speed on a speed-time graph.

A line for constant speed ________________________.

A line for increasing speed ________________________.

A line for decreasing speed ________________________.

---

**Summarize It**

Summarize the main ideas of the above sections in two bullet points.

- 
- 

---

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10  Motion
Lesson 3 Graphing Motion (continued)

Comparing Position-Time and Speed-Time Graphs

Create drawings in the boxes provided to contrast the four types of motion described.

<table>
<thead>
<tr>
<th>Type of Motion</th>
<th>Position-Time Graph</th>
<th>Speed-Time Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object at rest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object moving at constant speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object speeding up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object slowing down</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I found this information on page _________.

Summarize two main ideas of the above section.

__________________________
Motion Chapter Wrap-Up

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

<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 Standards Check at the end of each lesson.
☐ Look over the Standards Review at the end of the chapter.

SUMMARIZE IT

After studying the chapter, write one summary sentence for each lesson to illustrate the chapter's main ideas.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________
Forces

Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about forces in the first column. Then list three things that you would like to learn about forces in the second column.

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

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

Science Journal

Describe three examples of pushing or pulling on an object. In each case, how did the object move?
Forces
Lesson 1  Combining Forces

Scan Lesson 1 of your book. Read the headings, and look at the illustrations. Predict three things that will be discussed.

1. 
2. 
3. 

Define vector using your book or a dictionary.

vector

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

force that is exerted only when two objects are touching

idea stating that when the net force acting on an object is zero, an object at rest remains at rest, and that when the object is moving, it continues to move in a straight line with constant speed

push or pull

combination of all of the forces acting on an object

state in which the net force acting on an object is not zero

state in which the net forces acting on an object are zero

force that one object exerts on another when the objects are not touching

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

specify
Lesson 1 Combining Forces (continued)

Main Idea

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

Combining Forces
I found this information on page __________.

Details

Organize information about contact forces and noncontact forces by completing the diagram.

Model force vector arrows to show the net forces that result when each pair of forces is combined. Label the magnitude of each net force.

Forces Acting in Same Direction

 Forces Acting in Opposite Directions

Net Force:

5N 10N

5N 10N

Summarize three main ideas of the above sections.

Summarize it

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
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<td></td>
</tr>
</tbody>
</table>
Create two drawings to show how an object is affected by balanced and unbalanced forces moving in opposite directions. Use arrows and labels to show the forces and motions. Below each drawing, explain the effect of the forces.

**Balanced Forces**

**Unbalanced Forces**

---

**Newton’s First Law of Motion**

I found this information on page _________.

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

---

**Define** inertia.

Inertia is ___________________________.

---

**Summarize It**

Summarize the main ideas of the above sections with two bullet points.

- _________________________________
- _________________________________
Forces
Lesson 2 Types of Forces

Grade 8 Science Content Standards—2.d: Students know how to identify separately the two or more forces that are acting on a single static object, including gravity, elastic forces due to tension or compression in matter, and friction.

Scan the What You’ll Learn statements for Lesson 2 of your book. Identify three topics that will be discussed.

1. 
2. 
3. 

Define velocity, using your book or a dictionary.

velocity

Use your book to define the following terms.

gravity

weight

friction

elastic force

tension force

compression force

normal force

Use a dictionary to define involve.

involve

Name ___________________________ Date _____________
Lesson 2 Types of Forces (continued)

Main Idea

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

Details

Rephrase the law of universal gravitation.

Label the diagrams to indicate how a change in distance or mass affects the gravitational attraction between objects.

As distance increases, gravitational attraction ____________.

As mass increases, gravitational attraction ____________.

Summarize the main ideas of the above sections with two bullet points.

1. ________________________________________________________________________
2. ________________________________________________________________________

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Organize information about friction by completing the table.

<table>
<thead>
<tr>
<th>Type of Friction</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static Friction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sliding Friction</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Distinguish between the two types of forces that produce elastic forces by completing the graphic organizer.

Elastic Forces

I found this information on page _________.

Summarize two main ideas of the above sections.

I found this information on page _________.

<table>
<thead>
<tr>
<th>Elastic Forces</th>
</tr>
</thead>
<tbody>
<tr>
<td>are produced by</td>
</tr>
</tbody>
</table>

which is a

exerted when a material is

which is a

exerted when a material is

Summarize two main ideas of the above sections.
Lesson 2 Types of Forces (continued)

**Main Idea**

**Elastic Forces**

Create a drawing showing the forces acting on a cup resting on a table. Use arrows to show the directions in which the forces act. Label each arrow with the force it represents.

**Details**

For a book sliding on a table, classify forces that act in the horizontal direction and forces that act in the vertical direction by completing the graphic organizer.

**Identifying Forces on an Object**

Summarize two main ideas of the above sections.
Forces
Lesson 3  Unbalanced Forces and Acceleration

Grade 8 Science Content Standards—2.e: Students know that when the forces on an object are unbalanced, the object will change its velocity (this is, it will speed up, slow down, or change direction). Also covers: 2.f

Scan Lesson 3 of your book. Use the checklist below.

☐ Read all of the headings.
☐ Read all of the bold words.
☐ Look at the pictures and tables.
☐ Think about what you already know about unbalanced forces and acceleration.

Write two things that you will learn about unbalanced forces and acceleration.

1. __________________________________________
2. __________________________________________

Define acceleration, using your book or a dictionary.

acceleration

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

centripetal force

Newton’s second law of motion

Newton’s third law of motion
Unbalanced Forces and Velocity

I found this information on page __________.

Details

Analyze how unbalanced forces change the velocity and acceleration of objects by completing the cause-and-effect graphic organizers below.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>unbalanced force exerted on object at rest</td>
<td></td>
</tr>
<tr>
<td>unbalanced force applied in the same direction an object is moving</td>
<td>object slows down</td>
</tr>
</tbody>
</table>

Create a top view of an object moving in a circle at constant speed, such as a ball on a string. Show at least two positions of the object. At each position, draw an arrow for the object’s velocity and another arrow for the centripetal force of the object.

Summarize a main idea of the above section.

I found this information on page __________.
Lesson 3  Unbalanced Forces and Acceleration (continued)

**Main Idea**

**Newton’s Second Law of Motion**

I found this information on page ___________.

**Details**

**Complete** the concept map with properties of an object that are related by Newton’s second law of motion.

![Concept Map]

**Define** how to calculate average acceleration using Newton’s second law of motion. **Complete the formula and the chart below.**

\[ \text{acceleration} = \frac{F}{m} \]

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Stands for</th>
<th>Measured in</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>net force</td>
<td>newtons; N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>kilograms; kg</td>
</tr>
</tbody>
</table>

**Newton’s Third Law of Motion**

I found this information on page ___________.

**Identify** the two forces involved in a force pair.

________________________________________

________________________________________

**Summarize It**

Summarize a main idea from the above section.

________________________________________

________________________________________

________________________________________
Forces  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>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 studying the chapter, write one summary sentence for each lesson to illustrate the chapter’s main ideas.

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 tables and illustrations.
☐ Review the Standards Check at the end of each lesson.
☐ Look over the Standards Review at the end of the chapter.

Summarize It

After studying the chapter, write one summary sentence for each lesson to illustrate the chapter’s main ideas.
Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about density and buoyancy in the first column. Then list three things that you would like to learn about them in the second 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.

Compare and contrast three objects that float with three objects that sink.

__________________________

__________________________

__________________________

__________________________

__________________________

__________________________
Density and Buoyancy
Lesson 1 Density

Grade 8 Science Content Standards—8.a: Students know density is mass per unit volume. Also covers: 8.b, 9.f

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

☐ Read all of the headings.
☐ Read all of the bold words.
☐ Look at the tables and pictures.
☐ Think about what you already know about density.

Write three facts that you discovered.
1. 

2. 

3. 

Review Vocabulary

Define volume using your book or a dictionary.

volume

New Vocabulary

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

density

rectangular solid

Academic Vocabulary

Define preceding.

preceding
Lesson 1 Density (continued)

**Main Idea**

**What is density?**
I found this information on page __________.

**Details**

**Draw and label an arrow to show how density changes as the mass and number of particles in an equal volume change.**

<table>
<thead>
<tr>
<th>less mass</th>
<th>more mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>fewer particles</td>
<td>more particles</td>
</tr>
</tbody>
</table>

**Complete the equation with words to show how density is calculated. Give the unit for each part of the equation. Then write the equation with symbols.**

density (__________) = ______________ divided by ______________

Equation: ___________

**Summarize the two properties that change when a material is broken into smaller pieces and the one that does not.**

The ____________ and ____________ of the material change, but its ____________ does not change.

**Analyze the factors that determine the density of a material. Complete the diagram.**

The density of a material depends on

**Summarize It**

Summarize the main ideas of the above section in two bullet points.

1. ____________________________________________
2. ____________________________________________
Summarize the steps used to find the density of a liquid.

1. 
2. 
3. 

Complete the formula below to show how to calculate the volume of a rectangular solid.

Volume = \( \text{length} \times \text{width} \times \text{height} \)

Sequence the steps used to find the volume of an irregular solid. Draw how the lab equipment might look for each step.

1. Place water in a graduated cylinder, and record its volume.

2. 

3. 

Summarize two main ideas of the above section.

- 
- 
-
Density and Buoyancy
Lesson 2 Pressure and the Buoyant Force

Grade 8 Science Content Standards—8.c: Students know the buoyant force on an object in a fluid is an upward force equal to the weight of the fluid the object has displaced. Also covers: 9.f

**Scan** the headings in Lesson 2 of your book. Predict three topics that will be discussed.

1. 
2. 
3. 

**Review Vocabulary**

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

force

**New Vocabulary**

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

fluid

pressure

atmospheric pressure

buoyant force

**Academic Vocabulary**

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

area
Lesson 2 Pressure and the Buoyant Force (continued)

**Main Idea**

**Pressure in a Fluid**

Classify the 2 types of fluids, and give an example of each.

- **Fluids**
  - include
    - such as
    - such as

Summarize the effects of force and area on pressure by completing the diagram.

- Pressure increases if or

Sequence the diagrams to show how pressure is related to surface area. Number the diagrams from 1 (least pressure) to 3 (most pressure).

---

**Summarize It**

Rephrase two main ideas of the above section.

---

I found this information on page _________.

I found this information on page _________.

I found this information on page _________.

---

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Complete the equation for calculating pressure. Include the units used for each measurement. Then write the equation in symbols.

Pressure (in ________) = ________ (in ________) ________ (in meters squared)

Analyze how the pressure exerted by a fluid changes with height and depth.

As the height of a column of fluid increases, __________

As the depth below the surface of a fluid increases, __________

Model the effect of pressure on a fluid at different levels. Indicate the force with which milk would squirt out of holes punched in the side of the milk carton.

Summarize how atmospheric pressure changes as elevation changes.

Higher elevation → __________ atmospheric pressure

Summarize three main ideas of the above section.
Lesson 2 Pressure and the Buoyant Force (continued)

**Main Idea**

**What causes the buoyant force?**

I found this information on page __________.

**Details**

Model the buoyant force on an object. Draw a fish under water. Use arrows to show the forces acting on the fish. Then write a sentence explaining why the net force is upward.

I found this information on page __________.

Rephrase Archimedes’ principle in your own words.

I found this information on page __________.

Complete the diagram to show what determines the weight of the fluid displaced by an object.

Choose two main ideas from this section.
Density and Buoyancy
Lesson 3 Sinking and Floating

Grade 8 Science Content Standards—8.d: Students know how to predict whether an object will float or sink.

Skim Lesson 3 of your book. Write three questions that come to mind. Look for answers to your questions as you read the lesson.

1. 
2. 
3. 

Review Vocabulary
Define gravity using your book or a dictionary, then write a sentence to show its scientific meaning.

gravity

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

hydrometer

Academic Vocabulary
Use your book or a dictionary to define ratio, then use it in a sentence to show its scientific meaning.

ratio
Lesson 3 Sinking and Floating (continued)

**Main Idea**

**Why do objects sink or float?**

I found this information on page ________.

**Details**

**Analyze** what causes an object to sink or float. Complete the cause-and-effect diagrams.

- If upward buoyant force is greater than object’s weight, then ________.
- If upward buoyant force is less than object’s weight, then ________.

**Organize** information about the relationship between the density of an object and its ability to sink or float by completing the table.

<table>
<thead>
<tr>
<th>If the density of an object is . . .</th>
<th>Then it will . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than the density of a fluid</td>
<td></td>
</tr>
<tr>
<td>Greater than the density of a fluid</td>
<td></td>
</tr>
</tbody>
</table>

**The Buoyant Force and Density**

I found this information on page ________.

I found this information on page ________.

I found this information on page ________.

**Summarize** the reason that a metal boat floats even though the metal’s density is greater than that of water.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Identify** the function of a hydrometer.

A hydrometer is used to ____________________________.

**Summarize IT**

Summarize two main ideas of the above sections.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Lesson 3 Sinking and Floating (continued)

Main Idea

The Buoyant Force and Density

Model how a hydrometer floats in a liquid more dense than water and in a liquid less dense than water. Draw the hydrometer’s position in each diagram.

More dense than water

Less dense than water

Details

Compare and contrast helium and hot-air balloons. Complete the Venn diagram with at least five facts.

Helium Balloon

Both

Hot-Air Balloon

Floating and Sinking in the Atmosphere

I found this information on page _________.

SUMMARIZE IT

Rephrase the main ideas of the above sections.

______________
Density and Buoyancy 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>What I know</th>
<th>What I want to find out</th>
<th>What I learned</th>
</tr>
</thead>
</table>

Review

Use this checklist to help you study.

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

**SUMMARIZE IT**

After studying the chapter, write one summary sentence for each lesson to illustrate the chapter’s main ideas.
Understanding the Atom

Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about atoms in the first column. Then list three things that you would like to learn about atoms in the second column.

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

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

Science Journal

Write a paragraph on what you know about the atom.

---

Understanding the Atom 37
Understanding the Atom
Lesson 1 Atoms—Basic Units of Matter

Grade 8 Science Content Standards—3.a: Students know the structure of the atom and know it is composed of protons, neutrons, and electrons.

Scan the What You’ll Learn statements for Lesson 1. List three topics that will be discussed.
1. __________________________________________
2. __________________________________________
3. __________________________________________

Review Vocabulary

Define mass using your book or a dictionary.

mass

Write a paragraph using all of the vocabulary terms to show their meanings.

matter
atom
nucleus
proton
neutron
electron

New Vocabulary

Use your book or a dictionary to define proportion. Then use the term in a sentence.

proportion
Lesson 1 Atoms—Basic Units of Matter (continued)

**Main Idea**

**What is the current atomic model?**

I found this information on page __________.

**Details**

**Conclude** why the atomic-force microscope is important to scientists.

**Compare** protons, neutrons, and electrons.

<table>
<thead>
<tr>
<th>Particle</th>
<th>Where Found</th>
<th>Charge</th>
<th>Mass (amu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proton</td>
<td></td>
<td>+1</td>
<td></td>
</tr>
<tr>
<td>Neutron</td>
<td></td>
<td></td>
<td>1.008701</td>
</tr>
<tr>
<td>Electron</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Organize** information about Democritus’s theory of the atom using the concept map.

- Democritus’s Theory of the Atom
- [ ]
- [ ]
- [ ]

**Complete** the statement to summarize what an atom is.

An atom of aluminum is __________.

**Summarize IT**

Summarize three main ideas from the above sections.

- __________________________
- __________________________
- __________________________
Lesson 1 Atoms—Basic Units of Matter (continued)

**Main Idea**

Is there historical evidence of atoms?

I found this information on page __________.

**Details**

**Sequence** the steps of Antoine Lavoisier’s experiments on mercury (II) oxide. Complete the flow chart.

mercury (II) oxide placed in sealed container

**Summarize** the law of conservation of mass and the law of definite proportions.

Law of Conservation of Mass: __________________________

Law of Definite Proportions: __________________________

**Create** a concept map for the 5 principles of Dalton’s atomic model.

I found this information on page __________.

**Summarize It**

Summarize three main ideas of the above sections.

______________________________

______________________________

______________________________

40 Understanding the Atom
Understanding the Atom
Lesson 2 Discovering Parts of the Atom

Grade 8 Science Content Standards—3.a: Students know the structure of the atom and know it is composed of protons, neutrons, and electrons.

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

1. 
2. 
3. 

**Review Vocabulary**

**Define** electromagnetic spectrum using your book or a dictionary.

**New Vocabulary**

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

- **electromagnetic spectrum**
- **spectral line**
- **energy level**
- **electron cloud**

**Academic Vocabulary**

Use a dictionary to define research.

**Name ___________________________ Date ______________**
Lesson 2 Discovering Parts of the Atom (continued)

**Main Idea**

**How were electrons discovered?**

I found this information on page ________.

**Details**

Model *Thomson’s cathode-ray tube experiment. Draw a diagram showing the experiment.*

<table>
<thead>
<tr>
<th>Predicted Outcome</th>
<th>Actual Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize three conclusions Thomson drew from his experiments.

1. __________________________________________

2. __________________________________________

3. __________________________________________

Contrast the predicted and actual outcomes of Rutherford’s students’ gold-foil experiment.

<table>
<thead>
<tr>
<th>Predicted Outcome</th>
<th>Actual Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summarize It**

Summarize two main ideas from the above sections.

________________________________________

________________________________________

Understanding the Atom
Lesson 2 Discovering Parts of the Atom (continued)

**Main Idea**

Create a drawing showing Rutherford’s model of the atom. Label the nucleus and electrons.

Contrast the Bohr model and the Rutherford model of how electrons move in an atom.

Analyze how spectral lines are related to energy levels. Complete the statements.

When an electron falls from a higher energy level to a lower one, it ______________ energy. This produces _______________.

**Details**

Rutherford—Discovering the Nucleus

Bohr and the Hydrogen Atom

I found this information on page ____________.

I found this information on page ____________.

I found this information on page ____________.

Summarize two main ideas from the above sections.
Lesson 2 Discovering Parts of the Atom (continued)

<table>
<thead>
<tr>
<th>Main Idea</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bohr and the Hydrogen Atom</strong></td>
<td><strong>Model</strong> the Bohr atom. <em>Draw an atom including 2 energy levels.</em> <em>Show how many electrons can fit in each energy level.</em></td>
</tr>
<tr>
<td>I found this information on page __________.</td>
<td></td>
</tr>
</tbody>
</table>

| I found this information on page __________. | **Analyze** the strengths and weaknesses of the Bohr model of the atom. |
| | The Bohr model explained ______________. It did not explain ______________. |

| I found this information on page __________. | **Contrast** the electron cloud model with the Bohr model of the atom. |
| | ______________ |
| | ______________ |

**Summarize It**

Summarize the main ideas of the above sections of this lesson with three bullet points.

- 
- 
- 

*Understanding the Atom*
Scan Lesson 3 of your book. Read the headings and look at the illustrations. Predict three topics that will be discussed.

1. 

2. 

3. 

Define periodic table using your book or a dictionary.

periodic table

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

total mass of an atom

pure substance made from atoms that all have the same number of protons

number of protons in an atom of an element

atom that has gained or lost electrons and is no longer neutral

sum of the number of protons and neutrons that an atom has

atoms of the same element that have different numbers of neutrons

Use your book or a dictionary to define contrast.

contrast
Sequence the elements gold, copper, and sulfur in order by the number of protons in their nuclei. Write the atomic number for each element.

1. Element: ___________ Atomic number: ________
2. Element: ___________ Atomic number: ________
3. Element: ___________ Atomic number: ________

Model the periodic table. Shade the metals, nonmetals, and metalloids. Then draw and label an arrow to show how atomic number changes as you move across a row of the table.

Create a drawing showing two isotopes of neon with mass numbers of 20 and 22. Neon has an atomic number of 10.
Lesson 3 Elements, Isotopes, and Ions—How Atoms Differ (continued)

**Main Idea**

Isotopes—Different Numbers of Neutrons

I found this information on page __________.

**Details**

**Summarize** uses of some radioactive isotopes in the concept map.

<table>
<thead>
<tr>
<th>Uses of Radioactive Isotopes</th>
</tr>
</thead>
<tbody>
<tr>
<td>carbon-14</td>
</tr>
<tr>
<td>uranium-238</td>
</tr>
<tr>
<td>californium-252</td>
</tr>
</tbody>
</table>

Organize information about the 3 main isotopes of hydrogen. List the mass number and number of neutrons for each. Put a check mark by the radioactive isotope.

Protium: __________________________

Deuterium: __________________________

Tritium: __________________________

Contrast positive and negative ions. Draw an example of each. Then complete the rest of the table.

<table>
<thead>
<tr>
<th></th>
<th>Positive Ion</th>
<th>Negative Ion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sketch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formed when</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summarize It**

Summarize the main ideas of the above sections.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Understanding the Atom
Chapter Wrap-Up

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

<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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- Look over the Standards Review at the end of the chapter.

**Summarize It**
After reading the chapter, write one or two sentences to summarize the main ideas of each section.
Combining Atoms and Molecules

Grade 8 Science Content Standards—3.a: Students know the structure of the atom and know it is composed of protons, neutrons, and electrons. Also covers: 3.b, 3.c, 3.f, 7.c

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>Combining Atoms and Molecules</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The properties of a chemical compound are the same as the properties of each element it contains.</td>
<td></td>
</tr>
<tr>
<td>• An atom that receives an electron becomes negatively charged.</td>
<td></td>
</tr>
<tr>
<td>• Elements that are stable cannot form compounds.</td>
<td></td>
</tr>
<tr>
<td>• Most elements are metals.</td>
<td></td>
</tr>
</tbody>
</table>

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

Science Journal

Write three questions you have about solids.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Combining Atoms and Molecules
Lesson 1 How Atoms Form Compounds

Grade 8 Science Content Standards—3.a: Students know the structure of the atom and know it is composed of protons, neutrons, and electrons. Also covers: 3.b, 3.f

Skim Lesson 1 of your book. Predict four topics that might be discussed.

1. 
2. 
3. 
4. 

Define ion using your book or a dictionary.

ion

New Vocabulary

Use your book to define the following terms.

compound

chemical formula

molecule

chemical bond

ionic bond

valence

covalent bond

Academic Vocabulary

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

symbol
Lesson 1 How Atoms Form Compounds (continued)

**Main Idea**

**What is a compound?**

*Contrast elements with compounds by using the phrases to complete the Venn diagram.*

- made of more than one kind of atom
- about 100 kinds exist
- include water and table sugar

- include gold and carbon
- made of only one kind of atom
- can be described by a chemical formula

---

**Details**

*Identify two things a chemical formula tells you about a compound.*

- Chemical symbols indicate
- Subscript numbers indicate

---

**Summarize It**

Summarize two main ideas of the above sections.
Main Idea

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

Details

Distinguish between the properties of the elements sodium and chlorine and the compound that they form.

\[
\text{sodium} + \text{chlorine} \rightarrow \text{sodium chloride}
\]

Sequence the steps in the formation of lithium fluoride.

A lithium atom transfers _________________ to a fluorine atom.

The lithium atom becomes a _________________, and the fluorine atom becomes a _________________.

The two atoms form an _________________.

Identify the 6 properties of ionic compounds.

Properties of Ionic Compounds

Summarize the main ideas of the above sections.

Name ___________________________ Date ____________

Lesson 1 How Atoms Form Compounds (continued)

I found this information on page __________.

I found this information on page __________.

I found this information on page __________.

I found this information on page __________.

I found this information on page __________.

I found this information on page __________.

Combining Atoms and Molecules
Lesson 1  How Atoms Form Compounds (continued)

**Main Idea**

Ionic Bonds and Ionic Compounds

Summarize what can be learned about an element from its Lewis dot diagram.

Model the arrangement of the valence electrons of different elements by constructing a Lewis dot diagram for each element below.

<table>
<thead>
<tr>
<th>Lithium</th>
<th>Beryllium</th>
<th>Boron</th>
<th>Carbon</th>
<th>Nitrogen</th>
<th>Oxygen</th>
<th>Fluorine</th>
<th>Neon</th>
</tr>
</thead>
</table>

Define noble gas, and explain why noble gases are stable.

A noble gas is ____________________________

A noble gas is stable because ____________________

Identify five properties of covalent compounds.

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

**Details**

Covalent Bonds—Sharing Electrons

I found this information on page ________

Summarize the main ideas of the above sections in three bullet points.

_______

_______

_______

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Organize information about the types of covalent bonds by filling in the table below.

<table>
<thead>
<tr>
<th>Type of Covalent Bond</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td></td>
<td>H₂</td>
</tr>
<tr>
<td>Double</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triple</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compare and contrast ionic bonds and covalent bonds by completing the Venn diagram below with at least six facts.

Summarize two main ideas about covalent bonds with two bullet points.

1. 
2. 

Combining Atoms and Molecules
Review Vocabulary

Define element using your book or a dictionary.

element

New Vocabulary

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

bond formed when many metal atoms share their pooled electrons

ability of a substance to be pulled into wires

ability of a material to be hammered or rolled into sheets

regular, repeating arrangement of atoms, ions, or molecules

element that is usually shiny, a good conductor of heat and electricity, and a solid at room temperature

covalent compound made up of many small, repeating units linked together in a chain

small molecule that forms a link in a polymer chain

Academic Vocabulary

Use a dictionary to define the verb alternate. Then use it in a sentence.

alternate

Scan Lesson 2 of your book. Predict three topics that might be discussed.

1. __________________________

2. __________________________

3. __________________________
Lesson 2  Forming Solids (continued)

**Main Idea**

**Metals**

I found this information on page ____________.

**Crystals**

I found this information on page ____________.

**Details**

**Organize** information about metals in the table.

<table>
<thead>
<tr>
<th>Some Types of Metal</th>
<th>Examples of Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold</td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td></td>
</tr>
<tr>
<td>Aluminum</td>
<td></td>
</tr>
<tr>
<td>Steel (iron)</td>
<td></td>
</tr>
</tbody>
</table>

**Create** a spider diagram that shows the 5 physical properties of metals.

**Distinguish** between the types of bonds that can form crystals.

<table>
<thead>
<tr>
<th>Bonds That Can Form Crystals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Bond</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Summarize It**

Summarize two of the main points of the above sections.

__________________________
__________________________
Lesson 2  Forming Solids (continued)

**Main Idea**

**Crystals**

Model the unit cell for sodium chloride and quartz in the spaces below.

<table>
<thead>
<tr>
<th>Sodium Chloride</th>
<th>Quartz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**What is a polymer?**

A ___________ is a covalent compound made of many small, repeating units linked together in a ___________. The word polymer means ___________. A ___________ is a small molecule that forms a link in a polymer chain. The monomer ___________ links together to form polyethylene.

**Classify**

Complete the paragraph below about polymers.

Classify the examples of polymers in the table as synthetic or natural, and name the monomer that makes up each.

<table>
<thead>
<tr>
<th>Example</th>
<th>Type of Polymer</th>
<th>Monomer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene</td>
<td></td>
<td>ethene</td>
</tr>
<tr>
<td>DNA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protein</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbohydrate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summarize It**

Highlight the main idea of this section below.

Polymers are covalent compounds made up of repeating monomers. Polymers can be synthetic or natural. Examples of polymers include polyethylene, DNA, and carbohydrates.
Combining Atoms and Molecules
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>Combining Atoms and Molecules</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
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- Review daily homework assignments.
- Re-read the chapter and review the charts, graphs, and illustrations.
- Review the Standards Check at the end of each lesson.
- Look over the Standards Review at the end of the chapter.

Summarize It
After studying the chapter, list three key concepts you have learned about chemical bonds.
States of Matter

Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about states of matter in the first column. Then list three things that you would like to learn about states of matter in the second column.

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

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

Science Journal

List three differences between ice and water.

---

Name __________________________________________ Date ______________

States of Matter 59
States of Matter
Lesson 1 Solids, Liquids, and Gases

Grade 8 Science Content Standards—3.e: Students know that in solids the atoms are closely locked in position and can only vibrate; in liquids the atoms and molecules are more loosely connected and can collide with and move past one another; and in gases the atoms and molecules are free to move independently, colliding frequently. Also covers: 3.d

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

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

Write three things that you learn about states of matter.
1. __________________________________________
2. __________________________________________
3. __________________________________________

Define matter using your book or a dictionary.

matter

Write a paragraph that uses all the vocabulary terms in a way that shows their meanings.

solid

gas

random motion

liquid

Use a dictionary to define distribute.
Lesson 1 Solids, Liquids, and Gases (continued)

Main Idea

What are states of matter?

I found this information on page _________.

Details

Identify the 4 states of matter, and give an example of each.

<table>
<thead>
<tr>
<th>Four States of Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
</tbody>
</table>

Model the movement of particles in matter by random motion. Show particles as dots, and use arrows to show the direction of movement. Write a caption to explain your model.

Caption: __________________________________________

Summarize the main ideas of the above sections.

____________________________________________________

____________________________________________________

____________________________________________________

States of Matter 61
Lesson 1 Solids, Liquids, and Gases (continued)

**Main Idea**

**Solids**
*Identify the main characteristics of solids.*

---

**Liquids**
*Compare characteristics of solids and liquids.*

- **Solids**
  - Shape: fixed
  - Volume: fixed
  - Motion of particles: fixed

- **Liquids**
  - Shape: fixed
  - Volume: fixed

**Gases**
*Organize information about gases in the outline.*

1. Gas particles
   a. _______________________
   b. _______________________
2. Shape and volume of gases
   a. _______________________
   b. _______________________

---

**SUMMARIZE IT**

Summarize three main ideas from the above sections.

---

States of Matter
Skim Lesson 2 of your text. Write three questions that come to mind.
1. 
2. 
3. 

Define potential energy using your book or a dictionary.

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

- temperature at which a liquid changes to a solid
- measure of the average kinetic energy of all the particles in an object
- change of a gas to a liquid
- temperature at which a solid changes to a liquid
- change of a liquid to a gas
- change of a solid to a gas without first going through the liquid state
- vaporization that occurs throughout a liquid
- vaporization at the surface of a liquid
- change of a gas to a solid without first going through the liquid state
- temperature at which a liquid changes to a gas

Use a dictionary to define remove.
Lesson 2 Changes in States of Matter (continued)

**Main Idea**

**Temperature, Thermal Energy, and Heat**

I found this information on page ____________.

**Details**

**Summarize** how kinetic energy is related to temperature.

Distinguish **two ways a material can change when its thermal energy increases**.

- A material is heated.
  - if kinetic energy increases
  - if only potential energy increases

**Compare** melting and freezing by labeling the diagram.

- Thermal energy is ____________.

```
Matter in ____________ state.
```

```
Melting
```

```
Freezing
```

```
Matter in ____________ state.
```

Summarize the main ideas of the above sections.
Lesson 2 Changes in States of Matter (continued)

Main Idea

Changes Between Liquids and Gases

I found this information on page ___________.

Changing the State of Water

I found this information on page ___________.

Changes Between Solids and Gases

I found this information on page ___________.

Details

Compare and contrast vaporization, and condensation.

<table>
<thead>
<tr>
<th>What Happens</th>
<th>Location</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaporization: Boiling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaporization: Evaporation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condensation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Label the diagram below to show how a piece of ice changes as thermal energy is added to it. Use the terms provided.

melting point boiling point solid gas liquid

increasing thermal energy

Contrast sublimation and deposition.

Sublimation: ____________________________

Deposition: ____________________________

Summarize IT

Summarize the main ideas of the above sections.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

States of Matter 65
States of Matter  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>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I know</td>
<td>What I want to find out</td>
<td>What I learned</td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

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

SUMMARIZE IT

After reading the chapter, write three sentences summarizing the main ideas of the chapter.

________________________________________

________________________________________

________________________________________
The Periodic Table and Physical Properties

Grade 8 Science Content Standards—3.f: Students know how to use the periodic table to identify elements in simple compounds. Also covers: 5.d, 7.a, 7.b, 7.c

Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about the periodic table and physical properties in the first column. Then list three things that you would like to learn about the topic in the second column.

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

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

Science Journal

Write a paragraph explaining why you think it’s helpful to keep your books, notebooks, and papers organized.

________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________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The Periodic Table and Physical Properties

Lesson 1 Organization of the Periodic Table

Grade 8 Science Content Standards—3.f: Students know how to use the periodic table to identify elements in simple compounds. Also covers: 7.a

Scan Lesson 1 of your book. Write two facts you discovered about the periodic table while scanning the lesson.

1. ____________________________________________________________
   ____________________________________________________________

2. ____________________________________________________________
   ____________________________________________________________

Define element. Then use the term in a sentence.

   element

   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

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

   period
   ____________________________________________________________

   group
   ____________________________________________________________

   conductivity
   ____________________________________________________________

   halogen
   ____________________________________________________________

Use your book or a dictionary to define the term conduct as it is used in the following sentence.

   The chairperson of the committee will conduct the meeting.

   conduct
   ____________________________________________________________
Lesson 1 Organization of the Periodic Table (continued)

Main Idea

How are the elements arranged?

Organize the information found in an element block of the periodic table by filling in the graphic organizer.

Outline information about periods and groups.

I. Periods
   A. ____________________________________________
   B. ____________________________________________

II. Groups
   A. ____________________________________________
   B. Similar properties
      1. Examples of chemical properties, Group 2
         a. ____________________________________________
         b. ____________________________________________
      2. Examples of physical properties, Group 2
         a. ____________________________________________
         b. ____________________________________________

Summarize two main ideas of the above sections.

________________________________________________________________________

________________________________________________________________________
Lesson 1 Organization of the Periodic Table (continued)

Main Idea

What are the regions of the periodic table?

I found this information on page ___________.

Details

Compare and contrast the 3 regions of the periodic table.

<table>
<thead>
<tr>
<th>Region</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>semiconductors, properties of both metals and nonmetals</td>
</tr>
</tbody>
</table>

Identify the areas of the periodic table in which the most reactive metals and nonmetals are found.

Distinguish noble gases from other nonmetals.

Are there other periodic tables?

I found this information on page ___________.

Summarize the main ideas of the above sections with two bullet points.

Summarize It

Summarize the main ideas of the above sections with two bullet points.

Found in compounds in nature? yes no

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70 The Periodic Table and Physical Properties
The Periodic Table and Physical Properties
Lesson 2 Isotopes and Radioactivity

Grade 8 Science Content Standards—7.b: Students know each element has a specific number of protons in the nucleus (the atomic number) and each isotope of the element has a different but specific number of neutrons in the nucleus.

Scan the lesson titles and bold words in Lesson 2. Write two facts that you discovered about the topic as you scanned the lesson.
1. 
2. 

Define isotopes using your book or a dictionary.

Match the correct term with its definition.

- time it takes for a sample of a radioactive element to decay to half its original mass
- change of an unstable atomic nucleus into another nucleus as it emits particles and energy
- element that has only radioactive isotopes
- radioactive element made by scientists or during nuclear reactions
- describes a nucleus that is unstable and undergoes radioactive decay
- machine capable of making particles move very quickly
- process in which an atom of one element is changed into an atom of another element

Use your book or a dictionary to find the scientific definition of the term process.
Lesson 2 Isotopes and Radioactivity (continued)

**Main Idea**

**Isotopes - Different Numbers of Neutrons**

Contrast three isotopes of carbon. Complete the table.

<table>
<thead>
<tr>
<th>Mass Number</th>
<th>Atomic Number</th>
<th>Number of Protons</th>
<th>Number of Neutrons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon-12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon-13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon-14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I found this information on page ____________.

Analyze why isotopes have similar chemical properties.

I found this information on page ____________.

What is radioactive decay?

Compare and contrast two types of radioactive decay. Complete the diagrams to show what happens when an atom releases an alpha particle and a beta particle.

An atom releases an alpha particle.

The atom loses _______ and _______

The element becomes _______.

An atom releases a beta particle.

The atom loses _______ and gains _______.

The element becomes _______.

I found this information on page ____________.

**Summarize It**

Write two sentences to summarize the above section.

_____________________________________________________________________
_____________________________________________________________________

72 The Periodic Table and Physical Properties
Lesson 2 Isotopes and Radioactivity (continued)

**Main Idea**

**What is radioactive decay?**

I found this information on page ___________.

**Details**

Identify two uses of radioactivity.

1. ____________________________

2. ____________________________

Summarize how uranium's long half-life explains why it is still found in nature.

Sequence the steps used by scientists to produce synthetic elements. Complete the flow chart.

Create a concept map about the rules used by scientists to decide whether a new synthetic element has been created.

**Summarize It**

Summarize the main ideas of the above sections.
Grade 8 Science Content Standards—5.d: Students know physical properties include freezing and boiling, in which a material changes form with no chemical reaction. Also covers: 7.c, 9.a

**Skim Lesson 3. Write two questions that come to mind. Look for the answers as you read.**

1. 
2. 

**Define** density using its scientific meaning.

**New Vocabulary**

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

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>physical property</td>
<td></td>
</tr>
<tr>
<td>melting point</td>
<td></td>
</tr>
<tr>
<td>boiling point</td>
<td></td>
</tr>
<tr>
<td>thermal conductivity</td>
<td></td>
</tr>
<tr>
<td>physical change</td>
<td></td>
</tr>
</tbody>
</table>

**Academic Vocabulary**

Use your book or a dictionary to define transfer.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>transfer</td>
<td></td>
</tr>
</tbody>
</table>
Lesson 3 Physical Properties and Changes (continued)

Main Idea

What is a physical property?

I found this information on page ____________.

Details

Create a graphic organizer to identify the 10 physical properties.

I found this information on page ____________.

Draw and label an arrow to show how the melting point and boiling point of a substance depend on the attraction between particles.

I found this information on page ____________.

Complete the following paragraph to summarize information about density and hardness.

Density is the ________________ of a substance. The density of a substance is ________________ if its particles are packed tightly together. Hardness shows ________________.

I found this information on page ____________.

Summarize three main ideas from the above section.

________________________

________________________

________________________
Lesson 3 Physical Properties and Changes (continued)

Outline information about thermal and electrical conductivity.

I. Thermal conductivity
   A. Ability to transfer heat through
   B. 
      1. 
      2. 
   C. Low conductivity in gases
      1. 
      2. 

II. Electrical conductivity
   A. Ability to transfer
   B. 
   C. Plastic has

Organize information about examples of physical changes.

<table>
<thead>
<tr>
<th>Physical Change</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissolving</td>
<td></td>
<td>mixing iron filings and sand</td>
</tr>
<tr>
<td></td>
<td>changing a substance from its original state to a solid, liquid, or gas</td>
<td></td>
</tr>
</tbody>
</table>

Summarize It Highlight one main idea of this section in the paragraph below.

Ice cream melts into a liquid. Bubble gum is blown into a sphere. A piece of modeling clay is shaped into a statue. These are physical changes. A physical change is any change in size, shape, or state of matter in which the identity of the substance remains unchanged.

The Periodic Table and Physical Properties
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. You might write the atomic mass, the atomic number, or the symbol.
3. Swap sets of partially completed 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.
The Periodic Table and Physical Properties  Chapter Wrap-Up

Review

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.

<table>
<thead>
<tr>
<th>K What I know</th>
<th>W What I want to find out</th>
<th>L What I learned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</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 Standards Check at the end of each lesson.
☐ Look over the Standards Review at the end of the chapter.

Summarize It

After reading this chapter, write one or two summary sentences for each lesson to illustrate the chapter’s main ideas.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

78  The Periodic Table and Physical Properties
Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about the chemical reactions in the first column. Then list three things that you would like to learn about chemical reactions in the second 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.

Write three questions you would like to ask a chemist about air bags.

---

Chemical Reactions 79
Chemical Reactions
Lesson 1 Chemical Properties and Changes

Scan the headings in Lesson 1 of your book. Identify three topics that will be discussed.
1. 
2. 
3. 

Define physical property, using your book or a dictionary. Then use the term in a scientific sentence.

physical property

Write a paragraph using all of the vocabulary terms.

dissolving

compound

Use a dictionary to define compound.
Lesson 1 Chemical Properties and Changes (continued)

Main Idea

Ability to Change
I found this information on page _________.

Details

Compare and contrast chemical properties and physical properties by filling in the Venn diagram using the phrases listed.

- used to identify a substance
- observed without changing the identity of a substance
- ability to burn is an example
- color is an example
- observed by changing the identity of a substance

Identify at least one chemical property for each substance.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Chemical Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td></td>
</tr>
<tr>
<td>Helium gas</td>
<td></td>
</tr>
<tr>
<td>Hydrogen gas</td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td></td>
</tr>
</tbody>
</table>

Summarize IT
Summarize the main ideas of the above section.
Lesson 1 Chemical Properties and Changes (continued)

**Main Idea**

**Ability to Change**
I found this information on page __________.

**Chemical and Physical Changes**
I found this information on page __________.

**Details**

Identify six examples of physical properties of matter.

<table>
<thead>
<tr>
<th>Examples of Physical Properties of Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
<tr>
<td>6.</td>
</tr>
</tbody>
</table>

Compare and contrast chemical changes and physical changes by completing the Venn diagram, using the phrases listed.

- properties of substance change
- can often be reversed
- not easily reversed
- forms new substance
- identity of substance does not change
- dissolving is an example
- burning is an example
- includes changes of state

**SUMMARIZE IT**

Summarize three main ideas of the above sections.

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________
Chemical Reactions
Lesson 2 Chemical Equations

Grade 8 Science Content Standards—3.b: Students know that compounds are formed by combining two or more different elements and that compounds have properties different from their constituent elements. Also covers: 3.f, 5.b

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

1. 
2. 
3. 

Define molecule, using your book or a dictionary.

molecule

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

new substance formed in a chemical reaction

scientific principle stating that the total mass before a chemical reaction is the same as the total mass after the reaction

molecule that contains two atoms

starting substance in a chemical reaction

number in front of a symbol or formula that tells how many molecules or formula units take part in a reaction

Use a dictionary to define precise. Then use the term in a sentence to show how it is used in science.

precise
Lesson 2 Chemical Equations (continued)

**Main Idea**

Is matter conserved in chemical reactions?  
I found this information on page ________.

How do you write a chemical equation?  
I found this information on page ________.

**Details**

Rephrase *the law of conservation of mass in your own words.*

Label *the reactants and product in the equation below.*

\[ \text{tin} + \text{oxygen gas} \rightarrow \text{tin oxide} \]

Summarize two limitations of word equations.

Distinguish *between an element, a diatomic molecule, and a compound. Give an example of each, including the symbol.*

<table>
<thead>
<tr>
<th></th>
<th>What is it?</th>
<th>Example</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Element</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diatomic molecule</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compound</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summarize It**

Summarize the main ideas of the above sections of this lesson.
Lesson 2 Chemical Equations (continued)

**Main Idea**

How do you balance a chemical equation?

I found this information on page __________.

**Details**

Analyze *when a chemical equation is balanced*.

Contrast *the use of subscripts and coefficients in chemical equations*.

<table>
<thead>
<tr>
<th>Subscript</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tells</td>
<td>Tells</td>
</tr>
</tbody>
</table>

Sequence *the steps involved in balancing an equation. Complete the flow chart*.

Write the __________.

Count __________.

Place coefficients __________.

Complete *each equation below to summarize its chemical reaction*.

Reaction of methane:

__________ + ________O₂ → CO₂ + ________H₂O

Baking soda and vinegar:

__________ + ________ → ________ + ________ + NaC₂H₃O₂

**Summarize It**

Summarize two main ideas from the above sections.

---

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Chemical Reactions
Lesson 3 Energy and Chemical Change

Grade 8 Science Content Standards—5.c: Students know chemical reactions usually liberate heat or absorb heat.

Scan Lesson 3 of your book. Look at the headings, bold words, and pictures. Write three facts that you learn about energy and chemical change.

1. 

2. 

3. 

Use chemical bond in a sentence to show its scientific meaning.

Define each vocabulary term, using your book or a dictionary.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>chemical bond</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>law of conservation of energy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>exothermic process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>endothermic process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

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Lesson 3 Energy and Chemical Change (continued)

**Main Idea**

**Energy and Chemical Reactions**

I found this information on page ________.

**Details**

**Identify** five forms of energy that are released or used in chemical reactions.

I found this information on page ________.

**Rephrase** the law of conservation of energy in your own words.

I found this information on page ________.

**Organize** information about exothermic processes. Complete the concept map.

I found this information on page ________.

**Summarize It**

Summarize the main ideas of the above sections of this lesson.

______________________________________________________

______________________________________________________

______________________________________________________

______________________________________________________

______________________________________________________

______________________________________________________
Lesson 3 Energy and Chemical Change (continued)

**Main Idea**

**Net Absorption of Energy**

I found this information on page _________.

**Details**

Outline *information about* endothermic processes.

I. Properties of endothermic processes
   A. ____________________________
   B. ____________________________
   C. ____________________________

II. Examples of exothermic processes
   A. ____________________________
   B. ____________________________

Compare and contrast *endothermic* and *exothermic* processes by completing the Venn diagram with the terms below.

- net absorption of energy
- net release of energy
- may involve heat
- occurs as bonds break and reform

---

**Summarize It**

Summarize the main ideas of this section in two bullet points.

__________________________

__________________________
Tie It Together

Chemical Reactions

Use the information in the paragraph below and what you learned in the chapter to balance the chemical equation given and answer the questions.

Photosynthesis is the process by which plants make food in the form of the sugar glucose (C₆H₁₂O₆). Plants make glucose by using light energy to combine carbon dioxide (CO₂) and water (H₂O). In addition to glucose, oxygen (O₂) is also formed. The chemical equation for photosynthesis is shown.

Chemical Equation for Photosynthesis: \(\text{CO}_2 + \text{H}_2\text{O} + \text{Light Energy} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2\)

Count the atoms in the reactants and products.

Reactants: \________ + \________ Products: \________ + \________
Number of carbon atoms: \________ Number of carbon atoms: \________
Number of hydrogen atoms: \________ Number of hydrogen atoms: \________
Number of oxygen atoms: \________ Number of oxygen atoms: \________

Balanced Equation: \(6\text{CO}_2 + 6\text{H}_2\text{O} + \text{energy} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2\)

Count the atoms on each side of the balanced equation.

Reactants: Products:
Number of carbon atoms: \________ Number of carbon atoms: \________
Number of hydrogen atoms: \________ Number of hydrogen atoms: \________
Number of oxygen atoms: \________ Number of oxygen atoms: \________

Analysis

1. Summarize photosynthesis in a word equation.

______________________________________________________________

2. Classify photosynthesis as an endothermic or an exothermic reaction. Support your response with a specific example.

______________________________________________________________

______________________________________________________________
**Chemical Reactions  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>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I know</td>
<td>What I want to find out</td>
<td>What I learned</td>
</tr>
</tbody>
</table>

**Review**

*Use this checklist to help you study.*

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

**Summarize It**

*After reading the chapter, write a sentence or two summarizing the main idea of each lesson.*

---

90  *Chemical Reactions*
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>Acids and Bases in Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A compound is a type of mixture.</td>
<td></td>
</tr>
<tr>
<td>• You can dissolve any amount of salt in a glass of water.</td>
<td></td>
</tr>
<tr>
<td>• Soap is acidic.</td>
<td></td>
</tr>
<tr>
<td>• A substance that is neutral is neither an acid nor a base.</td>
<td></td>
</tr>
</tbody>
</table>

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

Write a brief paragraph on what you think these rocks are made from.
Acids and Bases in Solution
Lesson 1 Solutions

Grade 8 Science Content Standards—7.c: Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity.

Scan the What You’ll Learn statements for Lesson 1 of your book. Identify two topics that will be discussed.
1. 
2. 

Review Vocabulary

Define liquid using your book or a dictionary.

liquid

New Vocabulary

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

homogeneous mixture

matter that has the same composition and properties throughout

mixture in which the substances are not evenly mixed

substance that dissolves in a solution

two or more substances that are evenly mixed on the atomic level but are not bonded together

substance used to dissolve a solute

combination of two or more substances that can be separated by physical means

Use a dictionary to define individual.
Lesson 1 Solutions (continued)

**Main Idea**

What are the types of matter?

I found this information on page ________.

**Details**

Define the two main categories of matter.

<table>
<thead>
<tr>
<th>Substance:</th>
</tr>
</thead>
</table>

Categories of matter

<table>
<thead>
<tr>
<th>Mixture:</th>
</tr>
</thead>
</table>

Organize information about the 2 types of mixtures. Describe and give an example of each.

<table>
<thead>
<tr>
<th>Homogeneous Mixture</th>
<th>Heterogeneous Mixture</th>
</tr>
</thead>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>

Contrast the three solutions below. Identify the state of the solution, solvent, and solute. Describe how solutions are classified.

<table>
<thead>
<tr>
<th></th>
<th>Air</th>
<th>Soft Drink</th>
<th>14K Gold Alloy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solvent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solute</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summarize It**

Summarize three main ideas of the above sections.
Lesson 1  Solutions (continued)

Main Idea

Separating Mixtures by Physical Means
I found this information on page _________.

Solubility—How much can dissolve?
I found this information on page _________.

Concentration—How much is dissolved?
I found this information on page _________.

Details

Identify four physical properties or physical changes that can be used to separate mixtures.

1.  
2.  
3.  
4.  

Distinguish between saturated and unsaturated solutions.

Solutions

Unsaturated:
any solution that ________
________
at a given temperature.

Saturated:
any solution that ________
________
at a given temperature.

Analyze the solutions below. Write the concentration of the solution in grams per liter or as a percent.

Solution A: 10 g sodium chloride in 2 L solution
Concentration: ________

Solution B: 4 mL ethanol in 100 mL solution
Percent by Volume: ________

SUMMARIZE IT

Summarize three main ideas of the above sections.

_______________________________________________________________________

_______________________________________________________________________

_______________________________________________________________________

Acids and Bases in Solution
Main Idea

**Water as a Solvent**

I found this information on page ____________.

Details

Model a molecule of water to show its polarity. Mark the positive areas with a + and the negative areas with a –. Label the oxygen atoms, hydrogen atoms, and shared electrons.

Complete the table to show how water molecules attract polar molecules and ionic compounds.

<table>
<thead>
<tr>
<th>Polar Molecule</th>
<th>Ionic Compound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attracted by positive end of water molecule</td>
<td></td>
</tr>
<tr>
<td>Attracted by negative end of water molecule</td>
<td></td>
</tr>
</tbody>
</table>

Contrast electrolytes and nonelectrolytes. Complete the flow chart.

Does the substance form ions in water?

- yes
  - The substance is ________________ and ________________ conduct electricity in solution.

- no
  - The substance is ________________ and ________________ conduct electricity in solution.

Summarize three main ideas of the above sections.

______________________________
Name ___________________________ Date __________________

Acids and Bases in Solution
Lesson 2 Acidic, Basic, and Neutral Solutions

Grade 8 Science Content Standards—5.e: Students know how to determine whether a solution is acidic, basic, or neutral.

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

1. __________________________________________
2. __________________________________________
3. __________________________________________

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

**New Vocabulary**

Write a paragraph using all the vocabulary terms in a way that shows their meanings.

acid
hydronium ion
base
pH
indicator
pH meter

**Define** approximate, using your book or a dictionary. Then use it in a sentence to show its scientific meaning.

approximate
Lesson 2  Acidic, Basic, and Neutral Solutions (continued)

Main Idea

What are acids and bases?
I found this information on page _________.

Acids
I found this information on page _________.

Bases
I found this information on page _________.

Details

Identify at least two examples of everyday acids and bases.

<table>
<thead>
<tr>
<th>Acids</th>
<th>Bases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize important facts about acids. List one fact on each line.

Acids

Organize information about bases. Complete the diagram.

<table>
<thead>
<tr>
<th>Definition:</th>
<th>Common Properties:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Examples:</th>
<th>Common Uses:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize the main ideas of the above sections with two bullet points.

1. ___________________________
2. ___________________________
Lesson 2 Acidic, Basic, and Neutral Solutions (continued)

Main Idea

**What is pH?**

I found this information on page __________.

Details

**Label** the locations of acids, bases, and neutral substances on the pH scale below. Draw arrows to show how the concentrations of hydronium ions and hydroxide ions change across the pH scale.

---

Hydronium ions

Hydroxide ions

**Complete the equations below to compare pH values.**

A substance with pH 2 and a substance with pH 1

\[ \text{____ - ____ = ____; } 10^n = ____ = ____ \text{ times more acidic} \]

A substance with pH 5 and a substance with pH 2

\[ \text{____ - ____ = ____; } 10^n = ____ = ____ \text{ times more acidic} \]

**Define** neutralization.

---

Summarize three main ideas of the above sections using bullet points.

---

Acids and Bases in Solution
Lesson 2  Acidic, Basic, and Neutral Solutions (continued)

Main Idea

What is pH?
I found this information on page ___________.

How is pH measured?
I found this information on page ___________.

Details

Label the neutralization reaction below to identify its reactants and products as an acid, a salt, a base, and water.

\[2\text{HCl} + \text{Mg(OH)}_2 \rightarrow \text{MgCl}_2 + 2\text{H}_2\text{O}\]

Compare and contrast the methods for measuring pH. Complete the Venn diagram with the facts below. Then describe what a pH meter is.

- change color
- universal indicator is an example
- litmus paper is an example
- approximate pH

Indicators

Both

pH Strips

A pH meter is an __________________ with an ______________ that is sensitive to the __________________ in a solution.

Summarize IT

Summarize three main ideas of the above sections.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Acids and Bases in Solution
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>Acids and Bases in Solution</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A compound is a type of mixture.</td>
<td></td>
</tr>
<tr>
<td>• You can dissolve any amount of salt in a glass of water.</td>
<td></td>
</tr>
<tr>
<td>• Soap is acidic.</td>
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</tr>
<tr>
<td>• A substance that is neutral is neither an acid nor a base.</td>
<td></td>
</tr>
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</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 Standards Check at the end of each lesson.
- Look over the Standards Review at the end of the chapter.

Summarize It
After studying the chapter, write one summary sentence for each lesson to illustrate the chapter’s main ideas.
Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about the chemistry of living systems in the first column. Then list three things that you would like to learn about the chemistry of living systems in the second column.

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

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

Science Journal

What molecules do you think bears and humans have in common?

---

Chemistry of Living Systems

Grade 8 Science Content Standards—6.b: Students know that living organisms are made of molecules consisting largely of carbon, hydrogen, oxygen, phosphorus, and sulfur. Also covers: 3.c, 6.a, 6.c
Chemistry of Living Systems
Lesson 1 Chemistry of Life

Grade 8 Science Content Standards—6.b: Students know that living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur. Also covers: 6.a, 6.c

Scan Lesson 1 of your book. Read the headings and bold words and look at the pictures. Write three things that you discovered about the chemistry of living systems.

1. ____________________________________________________________
2. ____________________________________________________________
3. ____________________________________________________________

Define element as it is used in science. Use your book or a dictionary to help.

element

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

biomass

polar molecule

nonpolar molecule

Use your book or a dictionary to define cycle. Then use it in a sentence to show its scientific meaning.

cycle
Lesson 1 Chemistry of Life (continued)

Main Idea

Elements of Life
I found this information on page _________.

Cycles in Life
I found this information on page _________.

Details

Identify the 6 elements that make up most of Earth’s biomass.
1. ____________________ 4. ____________________
2. ____________________ 5. ____________________
3. ____________________ 6. ____________________

Create a cycle map in the space below showing the movement of carbon in the carbon cycle. Include labels to identify the form of carbon at each stage of the cycle. Use arrows to link the processes.

---

Model the path of nitrogen as it cycles through the environment. Complete the flow chart.

---

SUMMARIZE IT

Summarize the main ideas of the above sections.
Lesson 1 Chemistry of Life (continued)

**Main Idea**

Cycles of Matter

*Summarize how phosphorus cycles through the environment.*

Water and Living Organisms

*Analyze the importance of water to organisms. Complete the table.*

<table>
<thead>
<tr>
<th>Organisms</th>
<th>How Water is Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animals</td>
<td></td>
</tr>
<tr>
<td>Plants</td>
<td></td>
</tr>
<tr>
<td>One-celled organisms</td>
<td></td>
</tr>
</tbody>
</table>

**Outline** *Information about the unique characteristics of water.*

I. Resistance to temperature change
   A. 
   B. 

II. Density
   A. 
   B. 

III. Polarity
   A. 
   B. 
   C. 

**Summarize It**

Summarize two main ideas of the above sections.
Skim Lesson 2 of your book. Write three questions that come to mind. Look for answers to your questions as you read the lesson.

1. 
2. 
3. 

Define covalent bond using your book or a dictionary.

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

molecule that contains only carbon and hydrogen atoms

compound that contains at least one double or triple bond between carbon atoms

group of atoms that replaces a hydrogen atom in an organic compound

compound that contains the element carbon

organic compound that is a basic building block of proteins

compound that contains only single bonds between carbon atoms

Use your book or a dictionary to define the scientific meaning of substitute.
Lesson 2 Carbon Compounds (continued)

**Main Idea**

**Organic Compounds**

Identify the element found in all organic compounds.

Compare and contrast ethylene and ethyne by using the phrases listed to fill in the graphic organizer.

- plant hormone
- organic compound
- used for welding
- double bond between carbon atoms
- triple bond between carbon atoms
- made up only of carbon and hydrogen

Classify the 2 groups of hydrocarbon compounds.

<table>
<thead>
<tr>
<th>Bonds between carbon atoms</th>
<th>Saturated</th>
<th>Unsaturated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examples</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize two main ideas of the above section.

<table>
<thead>
<tr>
<th>Summarize It</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Name ____________________________________________ Date __________

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Model the first four hydrocarbons. Draw each compound and write its chemical formula.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>Ethane</td>
<td>Propane</td>
<td>Butane</td>
</tr>
<tr>
<td>Formula:</td>
<td>Formula:</td>
<td>Formula:</td>
<td>Formula:</td>
</tr>
</tbody>
</table>

Complete the table to summarize what information each part of a hydrocarbon’s name provides.

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Root</th>
<th>Suffix</th>
</tr>
</thead>
</table>

Analyze the hydrocarbons below. Identify how many carbon atoms are in each hydrocarbon and what type of bonds the carbon forms.

Name: Hexene
Carbon atoms: _________
Type of bonds: _________

Name: Butyne
Carbon atoms: _________
Type of bonds: _________

Summarize It
Rephrase two main ideas of the above section.
Lesson 2 Carbon Compounds (continued)

Main Idea

Substituted Hydrocarbons

I found this information on page __________.

Details

Organize information about alcohols. Complete the concept map.

Alcohols

Summarize the functional group found in carboxylic acids.

Contrast the functional groups found in amines and amino acids.

<table>
<thead>
<tr>
<th>Functional group(s)</th>
<th>Amines</th>
<th>Amino Acids</th>
</tr>
</thead>
</table>

Create drawings to show linear, planar, and tetrahedral molecules.

<table>
<thead>
<tr>
<th>Linear</th>
<th>Planar</th>
<th>Tetrahedral</th>
</tr>
</thead>
</table>

Summarize It

Summarize the main ideas of the above sections.

Name ________________________ Date ______________
Grade 8 Science Content Standards—6.c: Students know that living organisms have many different kinds of molecules, including small ones, such as water and salt, and very large ones, such as carbohydrates, fats, proteins, and DNA. Also covers: 6.a, 6.b

Scan the headings of Lesson 3 of your book. Predict three topics that will be discussed.

1. 
2. 
3. 

Review Vocabulary Define compound using your book or a dictionary.

compound 

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

lipid 

biomolecule 

nucleic acid 

carbohydrate 

synthetic polymer 

monomer 

Academic Vocabulary Define random using a dictionary. Then use the term in a sentence to show its scientific meaning.

random 

---
Lesson 3  Compounds of Life (continued)

**Main Idea**

**Polymers**

I found this information on page __________.

**Biological Molecules**

I found this information on page __________.

**Details**

**Complete** the statement to describe polymers.

Polymers are made up of __________ and can be __________ or __________.

**Identify** the biomolecules formed by the joining of each type of monomer.

Amino acids: __________________________

Sugars: __________________________

Nucleotides: __________________________

**Summarize** the chemical composition of a lipid.

________________________

________________________

**Analyze** the structure of DNA and RNA. Complete the diagram.

```
\[\text{Monomers} \rightarrow \text{Biomolecules} \rightarrow \text{DNA and RNA}\]
```

<table>
<thead>
<tr>
<th>Monomers</th>
<th>Biomolecules</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DNA and RNA</td>
</tr>
</tbody>
</table>

**Summarize It**

Summarize three main ideas from the above sections.

________________________

________________________

________________________
Lesson 3  Compounds of Life (continued)

Main Idea

**Biological Molecules**

I found this information on page _________.

**Details**

**Contrast** the 2 main types of fats.

Saturated fats have ________ bonds between carbon atoms and are ________ at room temperature. Unsaturated fats have ________ ________ ________ and are ________ at room temperature.

**Create** a concept map about complex carbohydrates. Include at least three facts.

[Blank]

**Other Elements in the Human Body**

I found this information on page _________.

**Identify** the function of each element in the human body.

1. Fluorine __________________________
2. Iron ______________________________
3. Magnesium _________________________
4. Calcium ____________________________
5. Copper _____________________________
6. Sulfur ______________________________

**Summarize It**

Summarize the main ideas of the above sections.
**Chemistry of Living Systems**

**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>
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<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 Standards Check at the end of each lesson.
- [ ] Look over the Standards Review at the end of the chapter.

**Summarize It**

After studying the chapter, write one summary sentence for each lesson to illustrate the chapter’s main ideas.

---

112  *Chemistry of Living Systems*
Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about the solar system in the first column. Then list three things that you would like to learn about the solar system in the second column.

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

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

How do you define a planet? Make a list of several criteria you would use to decide which objects would be classified as planets.

- 
- 
- 
- 
- 
- 
- 
- 
- 
-
Our Solar System
Lesson 1 Structure of the Solar System

Grade 8 Science Content Standards—4.e: Students know the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.
Also covers: 2.g, 4.c, 4.d

Skim Lesson 1. Pay attention to the section headings and bold words. Write 3 topics you predict will be covered in this lesson.
1. ________________________________
2. ________________________________
3. ________________________________

Define balanced forces using your book or a dictionary.

balanced forces ________________________________

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

axis of rotation ________________________________
period of rotation ________________________________
period of revolution ________________________________
ellipse ________________________________
astronomical unit ________________________________
planet ________________________________

Academic Vocabulary

Use your book or a dictionary to define force. Then use the term in a scientific sentence.

force ________________________________
Lesson 1 The Structure of the Solar System (continued)

Main Idea

What is the solar system?

I found this information on page ________.

The Motion of Planets

I found this information on page ________.

Kepler’s Laws of Planetary Motion

I found this information on page ________.

Details

Complete the statement about the solar system.

The solar system includes ____________________________

__________________________

Distinguish between the period of rotation and the period of revolution of a planet. Define each term below.

A planet’s period of rotation is ____________________________

__________________________. A planet’s period of revolution is ____________________________

Model the orbit of a planet. Draw the planet’s orbit according to Kepler’s first law.

Rephrase Kepler’s second and third laws in your own words.

Kepler’s Second Law: ____________________________

__________________________

Kepler’s Third Law: ____________________________

__________________________

Summarize one main idea from each section above.

__________________________

__________________________

__________________________
Analyze why the astronomical unit is used to measure distance in the solar system.

The astronomical unit is used because _____________

Design a graphic organizer to summarize at least three key facts about gravity and its role in the solar system.

Sequence the events that formed the solar system.
1. A cloud of gas and dust called a nebula formed.
2. ______________________________________
3. ______________________________________
4. ______________________________________
5. ______________________________________

Summarize three main ideas from the above sections.

__________________________

__________________________

__________________________
Review Vocabulary

Define gravity using your book or a dictionary.

New Vocabulary

Define each term below using your book or a dictionary. Then use the terms in a short paragraph about the Moon.

- satellite

- lunar phase

- eclipse

Use a dictionary to define phase.

Scan the headings, illustrations, and bold words in Lesson 2. Write three questions you have. Look for the answers as you read.

1. _______________________________________

2. _______________________________________

3. _______________________________________
Lesson 2 The Sun-Earth-Moon System (continued)

Main Idea

Earth’s Motion Around the Sun

Organize information about Earth’s orbit around the Sun. Complete the concept map.

Earth’s orbit is an ellipse.

Complete the statements below to describe Earth’s rotation.

Earth completes a rotation in about _________. Its axis is tilted at an angle of _______ to ____________________.

Sequence the events that led to the formation of the Moon, according to the present theory.

A large object ____________________.

Sequence

The Moon—Earth’s Satellite

I found this information on page ____________.

Summarize It

Summarize three main ideas from the above sections.

I found this information on page ____________.
Lesson 2 The Sun-Earth-Moon System (continued)

**Main Idea**

**The Moon—Earth’s Satellite**

Create a diagram showing the phases of the Moon. Include Earth and the direction of sunlight. Label each phase.

**Details**

**Eclipses**

Compare and contrast a solar eclipse and a lunar eclipse. Complete the Venn diagram with at least six facts.

**Summarize It**

Choose one main idea from each of the above sections. Rephrase these ideas in your own words.
Our Solar System
Lesson 3 The Planets and Their Moons

Grade 8 Science Content Standards—4.e: Students know the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids. Also covers: 4.d

**Skim** Lesson 3. Write three ideas you discover as you skim the lesson.

1. ____________________________________________________________

2. ____________________________________________________________

3. ____________________________________________________________

**Review Vocabulary**

**Define** atmospheric pressure using its scientific meaning.

**New Vocabulary**

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

**inner planet**

__________________________________________________________

__________________________________________________________

**outer planet**

__________________________________________________________

__________________________________________________________

**Academic Vocabulary**

Use a dictionary to define vehicle.

__________________________________________________________

__________________________________________________________
Lesson 3  The Planets and Their Moons (continued)

**Main Idea**

**The Inner Planets**

I found this information on page __________.

**Details**

**Summarize** key facts about Mercury.

Diameter: ________________________________

Distance from Sun: __________________________

Temperature: ______________________________

**Compare and contrast** Venus and Earth. Complete the table.

<table>
<thead>
<tr>
<th></th>
<th>Venus</th>
<th>Earth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmosphere</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period of Rotation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period of Revolution</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Organize** information about Mars. Complete the concept map.

**SUMMARIZE IT**

Summarize one main idea about each inner planet.

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________
Lesson 3  The Planets and Their Moons (continued)

Main Idea

The Outer Planets

I found this information on page __________.

Distinguish the 4 Galilean satellites of Jupiter. Write one fact about each satellite.

I found this information on page __________.

Create a graphic organizer of key information about Saturn.

I found this information on page __________.

Organize facts about Uranus and Neptune. Complete the table.

<table>
<thead>
<tr>
<th></th>
<th>Uranus</th>
<th>Neptune</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmosphere</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Known Moons</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize two main ideas from the above section.
Predict three topics that will be covered in Lesson 4. Use the section headings to help.

1. 

2. 

3. 

Define erosion using your book or a dictionary.

erosion

Use your book or a dictionary to define each term.

asteroid

comet

meteoroid

Use a dictionary to define impact. Then use it in a sentence to reflect its scientific meaning.

impact

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Lesson 4 Asteroids, Comets, and Meteroids (continued)

**Main Idea**

**Asteroids**

I found this information on page __________.

**Comets**

I found this information on page __________.

**Details**

**Organize** information about asteroids. Complete the concept map.

Model the parts of a comet. Draw a comet as it travels away from the Sun. Use the words below to label your drawing:

coma nucleus dust tail ion tail

Summarize the discoveries made by Deep Impact.

________________________

________________________

________________________

**Summarize IT**

Rephrase the main ideas of the above sections.

________________________

________________________

________________________

________________________

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Lesson 4  Asteroids, Comets, and Meteroids (continued)

**Main Idea**

**Comets**

I found this information on page ____________.

**Meteoroids**

I found this information on page ____________.

**Details**

**Complete** the concept map about Kuiper Belt objects.

Complete the flow chart.

**Sequence** the formation of meteoroids and what happens when they reach Earth. Complete the flow chart.

- Meteoroids formed when a small planet broke apart during ______________.
- Pieces of this planet ______________.
- Most ______________
  ______________
- A few ______________
  forming ______________.

**Summarize It**

Use three bullet points to summarize the main ideas of the above sections.

- 
- 
- 

Our Solar System 125
Our Solar System  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>W</th>
<th>L</th>
</tr>
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<tbody>
<tr>
<td>What I know</td>
<td>What I want to find out</td>
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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 Standards Check at the end of each lesson.
☐ Look over the Standards Review at the end of the chapter.

**Summarize It**

After reading this chapter, write four sentences summarizing its main ideas.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Our Solar System 126
Before You Read

Before you read the chapter, think about what you already know about the topic. List three things that you already know about stars and galaxies in the first column. Then list three things that you would like to learn about stars and galaxies in the second 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.

Write a short paragraph describing where you think stars are located relative to the solar system.

Write a short paragraph describing where you think stars are located relative to the solar system.
Grade 8 Science Content Standards—4.b: Students know that the Sun is one of many stars in the Milky Way galaxy and that stars may differ in size, temperature, and color. Also covers: 4.c, 4.d

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

1. 
2. 
3. 

**Review Vocabulary**

*Use your book to define spectral line.*

spectral line

**New Vocabulary**

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

light-year

luminosity

apparent magnitude

absolute magnitude

**Academic Vocabulary**

*Use a dictionary to define element. Then use it in a sentence to show its scientific meaning.*

element
Lesson 1 Stars (continued)

Main Idea

What are stars?
I found this information on page ____________.

What are stars made of?
I found this information on page ____________.

Details

Distinguish between the layers of a star by describing each one.

Outer layers:

Photosphere:

Core:

Compare the light-year with other units.

One light-year is about equal to ____________ kilometers

AU

Define the two types of spectra listed below.

Continuous spectrum: ____________________________

Absorption spectrum: ____________________________

Summarize It
Summarize the three main ideas of the above sections with three bullet points.

1. ____________________________

2. ____________________________

3. ____________________________
Lesson 1 Stars (continued)

**Main Idea**

**Temperature and Color of Stars**

Sequence the colors of stars by temperature.

- Cooler
- hotter

**The Brightness of Stars**

Compare the two ways of measuring magnitude by completing the diagram to show the relationship of each type of magnitude to a star’s distance from Earth.

- Apparent magnitude
- Absolute magnitude

**Classifying Stars—The H-R Diagram**

Classify the different types of stars on the Hertzsprung-Russell diagram by completing the table below.

<table>
<thead>
<tr>
<th>Type of Star</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main sequence</td>
<td></td>
</tr>
<tr>
<td>Red giant</td>
<td></td>
</tr>
<tr>
<td>Supergiant</td>
<td></td>
</tr>
<tr>
<td>White dwarf</td>
<td></td>
</tr>
</tbody>
</table>

**SUMMARIZE IT**

Summarize two main ideas of the above sections.
Skim through Lesson 2 of your book. Write three questions that come to mind from reading the headings and examining the illustrations.

1. 
2. 
3. 

Use your book or a dictionary to define pressure.

pressure

Use your book to define the following terms.

nebula

nuclear fusion

red giant

white dwarf

supernova

neutron star

black hole

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

contract

...
Lesson 2 How Stars Shine (continued)

**Main Idea**

**How Stars Form**

I found this information on page __________.

**How Stars Produce Light**

I found this information on page __________.

**Details**

**Sequence** the steps involved in the formation of a protostar.

1. A nebula contains ____________ of high density.
2. ____________ causes particles to clump together.
3. The mass ____________ causing temperature to ____________.
4. The mass becomes ____________.
5. A ____________ is born.

**Model** the steps involved in a nuclear fusion reaction that leads to a star’s producing visible light. Sketch and label the steps.

**Analyze** how the forces of pressure and gravity act on a star.

---

**Summarize It**

Summarize the three main ideas of the above sections of this lesson with three bullet points.

---

---
How Stars Come to an End

Compare and contrast the formation of a red giant with that of a white dwarf. Include at least six facts in the Venn diagram.

Organize information about neutron stars and black holes by filling in the blanks.

Neutron stars are made of _______________________________. The stars are very ______________ but very ______________. They form when ______________ and ______________ fuse to form ______________ in the core of a ______________. If a neutron star has a great enough mass, gravitational forces may be so strong that ______________ cannot escape. This is called a ______________.

SUMMARIZE IT
Highlight the main idea of this section in this passage.

When fusion stops within a star, there is no longer a balance between the forces of pressure and gravity. A star can collapse under the force of gravity. This can result in the formation of a white dwarf, a supernova, a neutron star, or a black hole.
Stars and Galaxies
Lesson 3 Galaxies

Grade 8 Science Content Standards—4.a. Students know galaxies are clusters of billions of stars and may have different shapes. Also covers: 4.b, 4.c

Preview Lesson 3 of your book. Use the checklist below.

☐ Read all of the headings.
☐ Read all of the boldface words.
☐ Look at the illustrations.
☐ Think about what you already know about galaxies.

Write two facts that you discovered during your preview.
1. __________________________________________
2. __________________________________________

Define ellipse using your book or a dictionary.

 ellipse

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

theory that the universe began 14 billion years ago as a tiny point that expanded at great speed

Use a dictionary to define randomly.

 randomly
Classify the three major types of galaxies. Complete the table.

<table>
<thead>
<tr>
<th>Galaxy Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spiral galaxy</td>
<td></td>
</tr>
<tr>
<td>Elliptical galaxy</td>
<td></td>
</tr>
<tr>
<td>Irregular galaxy</td>
<td></td>
</tr>
</tbody>
</table>

Model the Milky Way galaxy as it would appear if viewed from above. Indicate where the solar system lies within the galaxy.

Summarize the main ideas of the above sections with two bullet points.
Lesson 3  Stars and Galaxies (continued)

**Main Idea**

**The Distances Between Galaxies**

*Distinguish between galaxies, clusters, and superclusters by completing the sentences.*

Galaxies

Galaxies are so far away that to the unaided eye the closest ones appear as _________________. The closest galaxies to Earth are about _________________.

Clusters

Galaxies are not ________________ throughout the universe. Our galaxy is part of a cluster of galaxies called _________________.

Superclusters

A supercluster can spread across ________________ light-years.

**Details**

**The Big Bang Theory**

*I found this information on page ____________.*

**Summarize the big bang theory.**

---

**Summarize It**

Summarize the two main ideas of the above sections with two bullet points.

---
Tie It Together

Synthesize It

Construct a concept map that includes the following terms: clusters, stars, white dwarfs, galaxies, red giants, superclusters, main sequence stars, and universe. Construct the concept map so that it shows the relationship between the terms from the most inclusive to the least inclusive. Include key information for each of the terms in your map.
Stars and Galaxies  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.

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☐ Review the Standards Check at the end of each lesson.
☐ Look over the Standards Review at the end of the chapter.

SUMMARIZE IT
After studying the chapter, list three important things you have learned about stars and galaxies.

__________________________________________________________
__________________________________________________________
__________________________________________________________

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