

Chapter 1

Use with Text Pages 6-9

STUDY GUIDE

● Science Is Everywhere

Read each group of terms. Circle the two terms that are most related. In the spaces provided, explain how the terms are related. Write your answers in complete sentences.

1. (matter) animals, (energy)

Physical science is the study of matter and energy.

2. (knowledge, pure science) technology

Pure science is the study of something for the advancement of knowledge.

3. pure science, (technology, applied science)

Technology is applied science.

4. (sunlight) matter, (energy)

Sunlight is a form of energy.

5. (rocks, matter) energy

Rocks are an example of matter.

6. (electricity, sunlight) matter

Electricity and sunlight are forms of energy.

7. hardness, (observing, questioning)

Observing and questioning are processes of science.

For each term listed, write a definition using your own words.

8. technology: **Technology is the application of scientific knowledge to improve the quality of human life.**

9. physical science: **Physical science is the study of matter and energy.**

Answer the following question with complete sentences on the lines provided.

10. How does "pure" science differ from technology?

Pure science involves the study of a subject for the advancement of knowledge.

Technology involves the application of scientific knowledge ("pure" science) to improve the quality of life.

Chapter 1

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STUDY GUIDE

● Finding Out

In each of the following statements, a term has been scrambled. Unscramble the term and write it on the line provided.

exercise

1. The steps needed to find the solution are usually obvious in a *sciencex*.

critical thinking

2. A process that uses certain skills to solve a problem is *tacitric kinthing*.

theory

3. An explanation based on many observations supported by experimental results is a *yethor*.

scientific law

4. A "rule of nature" that sums up related observations and experimental results to describe a pattern in nature is a *scenicl*.

hypothesis

5. An educated guess about the possible solution to a problem is *pythoshise*.

model

6. An idea, system, or structure that represents something that is explained is a *domel*.

experiment

7. A hypothesis can be tested by conducting an *expertemin*.

problem

8. The solution is not obvious, and important information is missing in a *blepmor*.

observation

9. Using your senses to gather information is called *stobanroeca*.

matter

10. Physical science is concerned with the study of energy and *trn*.

experimental

11. A theory must be based on many observations and supported *taxlpeermnie* results.

information

12. Solving a problem involves finding missing *timrifonona*.

Chapter 2

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Standards of Measurement

Some prefixes used in SI are listed in the table below. Use the information in the table to answer questions 1-5.

SI Prefix	Meaning
kilo-	thousand (1000)
hecto-	hundred (100)
deka-	ten (10)
deci-	tenth (0.10)
centi-	hundredth (0.01)
milli-	thousandth (0.001)

- How many meters are in one kilometer? 1000 m
- What part of a liter is one milliliter? 0.001 or one thousandth
- How many grams are in two dekagrams? 20 g
- If one gram of water has a volume of one milliliter, what would the mass of one liter of water be in kilograms? one kilogram
- What part of a meter is a decimeter? 0.10 m or one tenth meter

In the blank at the left, write the term that correctly completes each statement. Choose from the terms listed below.

metric SI standard
 ten prefixes tenth

- standard 6. An exact quantity that people agree to use for comparison is a ____.
- SI 7. The system of measurement used worldwide in science is ____.
- ten 8. SI is based on units of ____.
- metric 9. The first system of measurement that was based on units of ten was the ____ system.
- prefixes 10. In SI, ____ are used with the names of the base unit to indicate the multiple of ten that is being used with the base unit.
- tenth 11. The prefix *deci-* means ____.

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Using SI Units

Match the terms in Column II with the descriptions in Column I. Write the letters of the correct term in the blank on the left.

- | Column I | Column II |
|--|----------------|
| <u>k</u> 1. distance between two points | a. time |
| <u>e</u> 2. SI unit of length | b. volume |
| <u>m</u> 3. tool used to measure length | c. mass |
| <u>g</u> 4. units obtained by combining other units | d. density |
| <u>b</u> 5. amount of space occupied by an object | e. meter |
| <u>h</u> 6. unit used to express volume | f. kilogram |
| <u>f</u> 7. SI unit of mass | g. derived |
| <u>c</u> 8. amount of matter in an object | h. liter |
| <u>d</u> 9. mass per unit of volume | i. second |
| <u>o</u> 10. temperature scale of most laboratory thermometers | j. kelvin |
| <u>l</u> 11. instrument used to measure mass | k. length |
| <u>a</u> 12. interval between two events | l. balance |
| <u>j</u> 13. SI unit of temperature | m. meterstick |
| <u>i</u> 14. SI unit of time | n. thermometer |
| <u>n</u> 15. instrument used to measure temperature | o. Celsius |

Circle the two terms in each group that are related. Explain how the terms are related.

- Celsius degree mass, kelvin **The Celsius degree and the kelvin are units of temperature.**
- balance second, mass **A balance is used to measure mass.**
- kilogram, liter, cubic centimeter **The liter and the cubic centimeter are units of volume.**
- time, second distance **The second is a unit of time.**
- decimeter, kilometer kelvin **The decimeter and kilometer are units of length.**

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● Graphing

Choose the term from the word list that best completes each statement. Write the term in the blank at the left of each statement.

graph
horizontal
hatch marks

vertical
independent
pie graph

dependent
bar graph
y-axis

line graph
x-axis
percentages

- _____ graph 1. A visual display of data or information is a ____.
- _____ bar graph 2. Information that is collected by counting can best be displayed on a ____.
- _____ vertical 3. In a line graph, the ____ axis is called the y-axis.
- _____ vertical or y-axis 4. In a line graph, the dependent variable is plotted on the ____.
- _____ pie graph 5. A graph that shows information as parts of a circle is a ____.
- _____ line graph 6. The type of graph that is useful for showing trends or continuous change is a ____.
- _____ percentages 7. Information in a pie graph is often shown as ____.
- _____ independent 8. Information that remains constant and does not depend on changes in the value of another variable is called the ____ variable.
- _____ horizontal or x-axis 9. In a line graph, the independent variable is plotted on the ____ axis.
- _____ hatch marks 10. Numbers that are left off a graph to save space can be shown using lines called ____.
- _____ dependent 11. A variable that changes as a result of the other variable is called a ____ variable.
- _____ x-axis 12. In a line graph, the horizontal axis is also called the ____.

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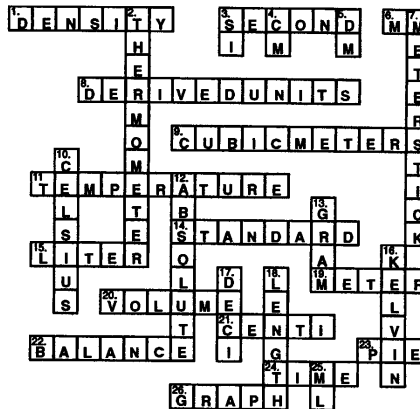
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● SI for All?

Solve the following crossword puzzle by using the clues provided.



Across

- mass per unit volume
- SI unit of time
- symbol for millimeter
- units of measurement that are obtained by combining other units (2 words)
- measurement expressed in m^3 (2 words)
- measure of how hot or cold something is
- an exact quantity people use for comparison
- unit of volume slightly larger than a quart
- SI unit of length
- measurement of amount of space an object takes up
- prefix meaning 0.01
- instrument used to measure mass
- type of graph expressed in a circle
- interval between two events
- a visual display of information or data

Down

- instrument used to measure temperature
- measuring system used worldwide
- symbol for millimeter
- symbol for centimeter
- tool used to measure length
- temperature scale used on most laboratory thermometers
- 0 K is called ____ zero
- unit that equals 0.001 kilogram
- SI unit of temperature
- prefix meaning 0.1
- distance between two points
- symbol for milliliter

Chapter 3

STUDY GUIDE

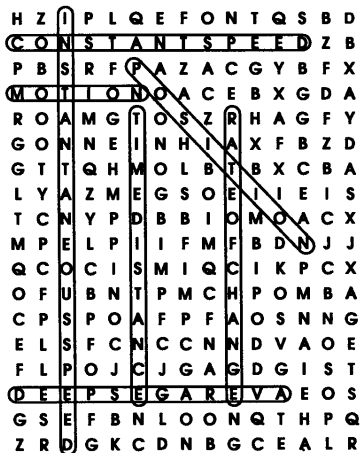
Use with Text Pages 64-71

● Motion and Speed

In each of the following statements, a term has been scrambled. Unscramble the term and write it on the line provided.

- position** 1. When something moves, it changes *its* **position**.
- Motion** 2. *Otoinm* can be described as a change in position.
- rate of change** 3. Speed is the *etra fo neahgc* in position.
- Instantaneous speed** 4. *Sitanuwseni eadps* is the rate of motion at any given instant.
- constant speed** 5. A speed that doesn't vary is called a *intrisoca dspee*.
- average speed** 6. The total distance traveled divided by the total time of travel is called the *eravnge pesed*.
- time-distance** 7. A *miat-nasidice* graph makes it possible to "see" the motion of an object over a period of time.

Now find each unscrambled term in the hidden word puzzle below. The terms can be written horizontally, vertically, or diagonally and forward or backward. Circle each term as you find it.



Chapter 3

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Use with Text Pages 72-75

● Velocity and Acceleration

Use the terms below to fill in the blanks.

acceleration	direction	meters per second squared (m/s^2)	slowing down
$a = \frac{v_f - v_i}{t} = \frac{\Delta v}{t}$	divide	meters per second (m/s)	subtract
	increasing speed	positive	time interval
	negative	seconds(s)	velocity change

Speed is the rate of motion of an object. **Velocity** describes an object's speed and direction. The velocity of an object can **change** even if the speed of the object remains constant. This would occur if the **direction** of the object's motion changes.

The rate of change of velocity is called **acceleration** . The size of an acceleration depends on both the change in velocity and the **time interval** of the change.

To calculate acceleration, **divide** the change in velocity by the time interval. To find the change in velocity, **subtract** the initial velocity (v_i) from the final velocity (v_f). The equation for average acceleration is $a = \frac{v_f - v_i}{t} = \frac{\Delta v}{t}$. Final velocity will be less than initial velocity if an object is **slowing down** , and acceleration will have a

 negative value. Final velocity will be greater than initial velocity if an object is **increasing speed** , and acceleration will have a **positive** value.

The units for velocity are **meters per second (m/s)** . The unit for time is **second(s)** . Therefore, the units for acceleration are **meters per second squared (m/s^2)** .

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● A Crash Course in Safety

Listed below are statements that either agree with the textbook or don't agree with the textbook. If the statement does agree, place a (✓) to the left of the statement. If the statement doesn't agree, rewrite it so it will agree with the textbook. Underline the words you change.

- ✓ 1. Researchers put lifelike dummies in cars for crash tests. _____

- _____ 2. When a car traveling about 50 km/h collides head-on with something solid, the car expands, speeds up, and goes on. When a car traveling about 50 km/h collides head-on with something solid, the car crumples, slows down, and stops.
- _____ 3. Within 0.1 second after a car crash, the car stops; but because of gravity, any passenger not wearing a seat belt continues to move forward at the same speed the car was traveling. Within 0.1 second after a car crash, the car stops; but because of inertia, any passenger not wearing a seat belt continues to move forward at the same speed the car was traveling.
- ✓ 4. By studying the results of crash tests and real car collisions, scientists have learned what happens to people in auto accidents. _____
- ✓ 5. A person in a car wearing a seat belt becomes "part" of the car and slows down when the car slows down. _____
- _____ 6. The force needed to slow a person from 50 km/h to zero in 0.1 second is equal to 2 times that person's height. The force needed to slow a person from 50 km/h to zero in 0.1 second is equal to 14 times that person's weight.
- ✓ 7. A seat belt not only holds a person in place; it also "gives," increasing the time it takes for a person to come to rest and spreading out the force so it's not concentrated on one part of the body. _____

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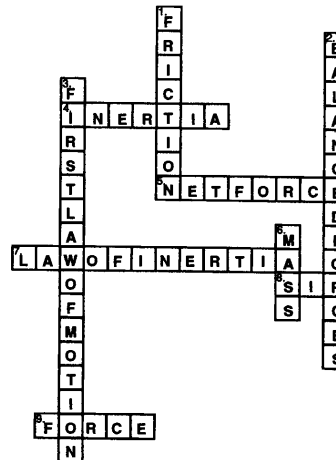
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● Connecting Motion with Forces

Solve the following crossword puzzle using the clues provided.



Across

- the tendency of an object to resist any change in its motion
- If this acts on an object, the object will change speed, change direction, or both. (2 words)
- another name for Newton's first law of motion (3 words)
- a title before Isaac Newton's name
- a push or pull that one body exerts on another body

Down

- the force that opposes motion between two surfaces that are touching each other
- forces that are equal in size and opposite in direction (2 words)
- Newton's law that says, "an object at rest stays at rest unless a net force acts on it" and, "an object moving at constant velocity continues at that velocity unless a net force acts on it." (4 words)
- The more of this an object has, the greater the object's inertia.