Name _____ Date _____

The Nature of Science

Section 1 The Methods of Science

Chapter 1

Skim *the headings and bold words in this section. Write four steps scientists might take to solve a problem.*

_____

_____

Review Vocabulary

Define investigation *to show its scientific meaning.*

investigation _____

New Vocabulary

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

_____ variable whose value changes as a result of changes in other variables

_____ standard used to compare the results of the experiment

_____ a factor is a quantity that can have more than one value

_____ a factor in an experiment that does not change

_____ represents an idea, event, or object to help people observe or test it

_____ the variable you change to see how it affects another variable

_____ occurs when a scientist's expectations change how the results are viewed

_____ the general pattern of investigational procedures

_____ a possible explanation of a problem based on observation and prior knowledge

_____ an explanation of things or events using observations and knowledge gained from multiple investigations

_____ a statement about what happens in nature that seems to be true all the time

_____ testing the effect of one thing on another under controlled conditions

Name _____ Date _____

Section 1 The Methods of Science (continued)

Main Idea	Details
What is science? *I found this information on page _____.*	**Identify** *the three main categories of science. Summarize the topic studied in each category.* 1. _____ 2. _____ 3. _____
Scientific Methods *I found this information on page _____.*	**Sequence** *the common steps found in scientific methods in the correct order. The first step has been completed for you.* 1. State the problem 2. _____ 3. _____ 4. _____ 5. _____ 6. _____
Visualizing with Models *I found this information on page _____.*	**Organize** *the advantages and disadvantages of a pilot flying a real airplane and flying a simulator.*

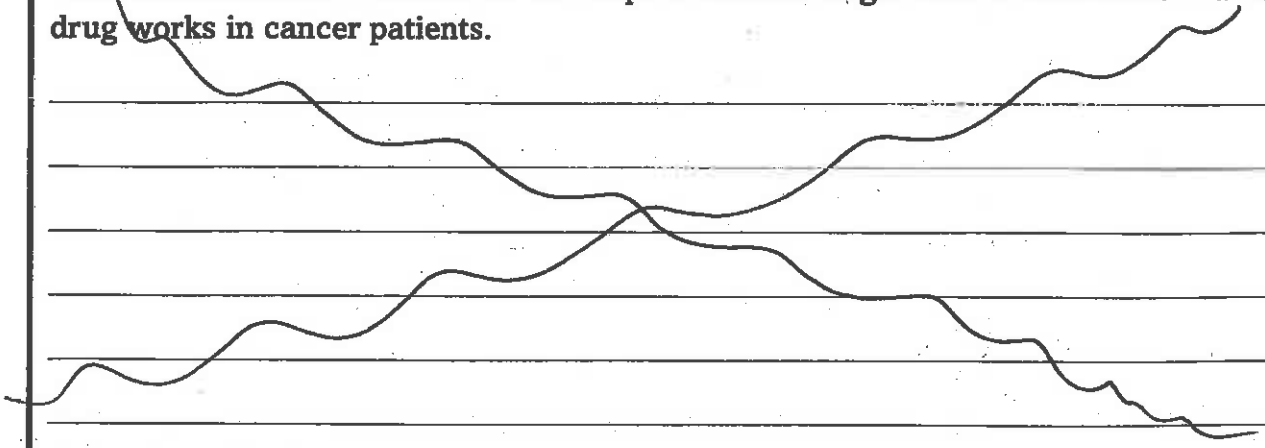
	Advantages	Disadvantages
Real airplane		
Simulator		

Name _____ Date _____

Section 1 The Methods of Science (continued)

Main Idea	Details
Scientific Theories and Laws *I found this information on page _____.*	**Distinguish *between a* scientific theory *and a* scientific law.**
The Limitations of Science *I found this information on page _____.*	**Complete *the paragraph about the* limitations of science.** Science _____ explain or solve everything. A scientist has to make sure his or her guesses can be _____ and _____. Science cannot answer questions about _____ and _____. For example, a _____ of people's opinions about such questions would not prove that the opinions are true for everyone. **Create *your own real-world example of how the application of a scientific discovery has helped create a new technology.***

CONNECT IT Summarize the steps a scientist might take to determine if a new drug works in cancer patients.



Name _____ Date _____

The Nature of Science

Section 2 Standards of Measurement

Skim *the headings in Section 2. Write three questions that come to mind about measurement.*

1. _____
2. _____
3. _____

Review Vocabulary

Define measurement *to show its scientific meaning.*

measurement _____

New Vocabulary

Use your book to define the following terms.

standard _____

SI _____

volume _____

matter _____

mass _____

density _____

_____

Academic Vocabulary

Define ratio *to show its scientific meaning. Then use it in a sentence as a noun.*

ratio _____

_____

Name _____ Date _____

Section 2 Standards of Measurement (continued)

Main Idea | **Details**

Units and Standards

I found this information on page _____.

Summarize *why* measurement standards *are necessary.*

_____

_____

_____

Measurement Systems

I found this information on page _____.

Complete *the table of* SI base units *used to measure various quantities.*

Quantity Measured	Unit	Symbol
Time		s
	kilogram	
		K
	candela	
Length		
	mole	
		A

Measuring Length

I found this information on page _____.

Create *an example of a real-world object that could be appropriately measured using each SI unit.*

meter _____

kilometer _____

millimeter _____

micrometer _____

Measuring Volume

I found this information on page _____.

Organize *the steps for finding the volume of a rectangular solid by listing them below.*

_____

_____

_____

_____

Name _____ Date _____

Section 2 Standards of Measurement (continued)

Main Idea | **Details**

Measuring Mass and Density

I found this information on page _____.

Identify *two pairs of objects that have about the same size but different masses.*

_____

_____

Complete *the table below. Place an X in the appropriate box to indicate the type of each measurement unit.*

Measurement	SI Unit	Derived Unit
gram per centimeter cubed (g/cm^3)		
decimeter (dm)		
liter (L)		
meter cubed (m^3)		
kilogram (kg)		

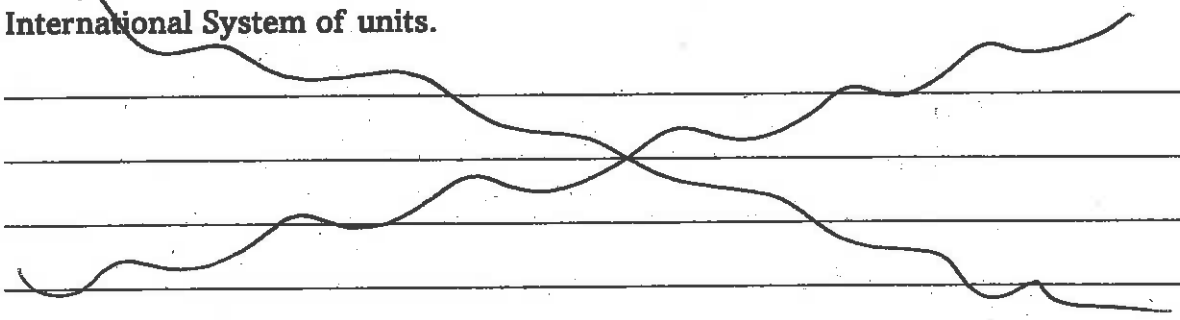
Measuring Time and Temperature

I found this information on page _____.

Model *three thermometers, a* Fahrenheit scale, *a* Kelvin scale, *and a* Celsius scale. *Label each to include the boiling and freezing points of water.*

SYNTHESIZE IT

Compare the advantages and disadvantages of converting our system of measurement in the United States from the English system to the International System of units.



Name _____ Date _____

The Nature of Science

Section 3 Communicating with Graphs

Scan *the headings, figures, and captions in Section 3 of your text. Write three questions that came to mind as you scanned this section.*

1. _____
2. _____
3. _____

Review Vocabulary

data

Define data *to show its scientific meaning.*

_____

New Vocabulary

graph

Use your book to define graph *to show its scientific meaning.*

_____

Academic Vocabulary

detect

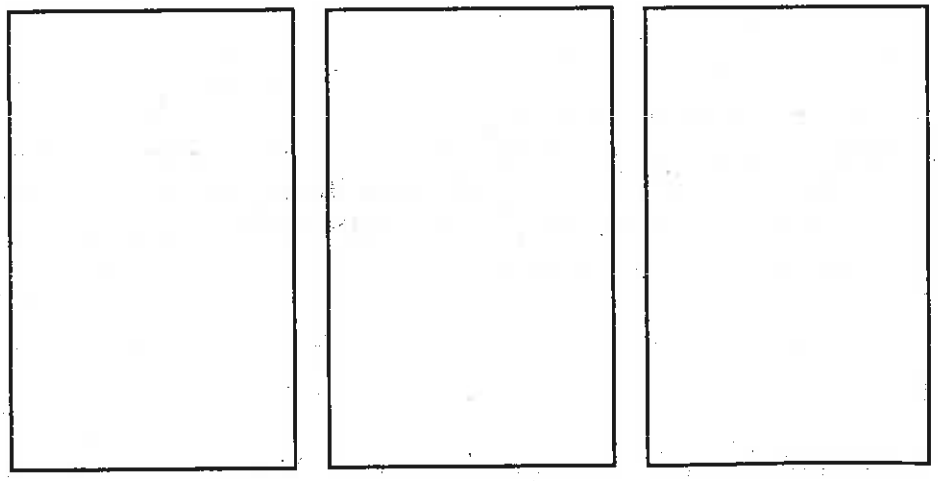
Use a dictionary to define the word detect.

_____

A Visual Display

I found this information on page _____.

Distinguish *between the three types of graphs described in this section. Draw and label a simple example of each graph.*



_____ _____ _____

Name _____ Date _____

Section 3 Communicating with Graphs (continued)

Main Idea | **Details**

A Visual Display

I found this information on page _____.

Summarize *four reasons scientists graph the results of their experiments.*

_____

_____

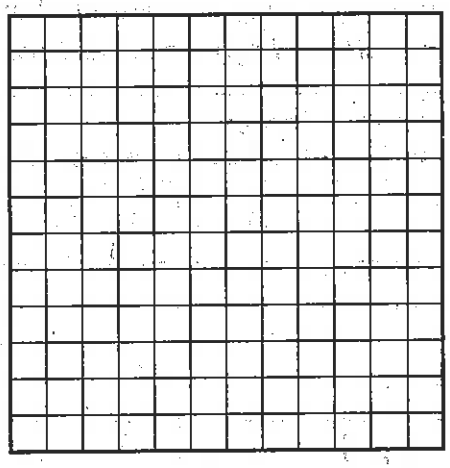
_____

_____

Line Graphs

I found this information on page _____.

Evaluate *the effectiveness of two fertilizers on plant growth by plotting the following data on a line graph. Be sure to label each axis.*



Week	Type A	Type B
1	2 cm	2 cm
2	7 cm	9 cm
3	15 cm	19 cm
4	20 cm	24 cm

Bar Graphs

I found this information on page _____.

Identify *the features of the bar graph in your book titled "Classroom Size" by completing the table.*

Feature	Description	Feature	Description
x-axis		maximum bar height	5
y-axis		minimum bar height	1
horizontal scale		maximum class size	27
vertical scale		minimum class size	20

Name _____ Date _____

Section 3 Communicating with Graphs (continued)

Main Idea

Circle Graphs

I found this information on page _____.

Details

Complete ***the following paragraph.***

A _____ graph is used to show how a certain quantity is _____ into parts. The circle represents the _____ and the segments represent the _____ of the whole. The segments are usually given as _____ of the whole.

Analyze ***the circle graph titled "Heating Fuel Usage" in your book to complete the first column in the table. Then use the formula provided for you in the table to complete the second column. Remember to use the decimal form of the percent of whole in the formula when finding angle of slice. The first one has been done for you.***

Heating Fuel	Percent of whole	Angle of Slice [percent of whole × 360° = angle of slice°]
Gas	50	0.5 × 360° = 180°
Steam		
Coal		
Electric		
Other		

SUMMARIZE IT

Describe when you would use each type of graph (line graph, bar graph, and circle graph) to show information.