

	It's Science	Method of Science	Experimentation	Measure Me This	SI is it!
100	Science for knowledge PURE SCIENCE	A testable prediction HYPOTHESIS	First step to designing an experiment STATE PROBLEM	Exact quantity used for comparison MEASUREMENT	Temperature KELVIN
200	The application of scientific knowledge practical APPLIED SCIENCE	The gathering of information OBSERVATION	Standard for comparison CONTROL	Graph used to show portions CIRCLE GRAPH	Unit for time SECOND
300	Study of matter and energy PHYSICS	Portion of experiment that is dependent on what the experimenter does DEPENDENT VARIABLE.	Portion of experimentation that is tested one at a time EXPERIMENTAL VARIABLE	-milli means .001 1/1000	SI is based on units of TEN
400	Describes behavior something SCIENTIFIC LAW	Portion of experiment controlled by experimenter INDEPENDENT VARIABLE	Which axis on a graph is for the dependent variable? HORIZONTAL/X	Kilo – means 1,000	Kg/dm ³ DENSITY
500	Representation of structure MODEL	Certain skills used to solve a problem CRITICAL THINKING	Explanation based on repeated observations and experiments THEORY	Measurement of a solid's volume could be in... .m ³ , cm ³ , dm ³	Measurement With Combinations of units DERIVED UNITS

	It's Science!	Method of Science	Experimentation	Measure Me This	SI is it!
100	Science for the sake of knowledge alone PURE SCIENCE	A testable prediction HYPOTHESIS	First step to designing an experiment STATE PROBLEM	Exact quantity used for comparison MEASUREMENT	Temperature KELVIN
200	The application of scientific knowledge for practical problems APPLIED/TECHNOLOGY	The gathering of information OBSERVATION	Standard for comparison CONTROL	Graph used to show portions	Unit for time
300	Study of matter and energy PHYSICAL SCIENCE	Portion of experiment that is dependent on what the experimenter does DEPENDENT VARIABLE.	Portion of experimentation that is tested one at a time EXPERIMENTAL VARIABLE	CIRCLE GRAPH -milli means .001 1/1000	SECOND SI is based on units of TEN
400	Describes behavior of something in nature SCIENTIFIC LAW	Portion of experiment controlled by experimenter INDEPENDENT VARIABLE	Which axis on a graph is for the dependent variable? HORIZONTAL/X	Kilo – means 1,000	Kg/dm ³ DENSITY
500	Representative idea, structure, or system MODEL	Certain skills used to solve a problem CRITICAL THINKING	Explanation based on repeated observations and experiments THEORY	Measurement of a solid's volume could be in... .m ³ , cm ³ , dm ³	Measurement With Combinations of units DERIVED UNITS

Chapter 2

Use with Text Pages 34-37

REINFORCEMENT

● Standards of Measurement

Fill in the missing information in the table below.

SI prefixes and their meanings	
Prefix	Meaning
milli	0.001
centi	0.01
deci-	0.1
deka	10
hecto-	100
kilo	1000

Circle the larger unit in each pair of units.

1. millimeter, kilometer

4. centimeter, millimeter

2. decimeter, dekameter

5. hectogram, kilogram

3. hectogram, decigram

6. In SI, the base unit of length is the meter. Use this information to arrange the following units of measurement in the correct order from smallest to largest. Write the number 1 (smallest) through 7 (largest) in the spaces provided.

7 a. kilometer6 e. hectometer2 b. centimeter1 f. millimeter4 c. meter3 g. decimeter5 d. dekameter

Use your knowledge of the prefixes used in SI to answer the following questions in the spaces provided.

7. One part of the Olympic games involves an activity called the decathlon. How many events do you think make up the decathlon? decathlon is 10 events

8. How many years make up a decade? ten years

9. How many years make up a century? 100 years

10. What part of a second do you think a millisecond is? 0.001 sec.

$$\text{Total} = 108 \div 4 = 27$$

Chapter 2

Use with Text Pages 38-47

REINFORCEMENT

● Using SI Units

15

1. Complete the table below by supplying the missing information.

Measurement	Base unit	Symbol
length	meter	m
mass	Kilogram	kg
time	second	s
temperature	Kelvin	K

In each of the following, circle the units that would most likely be used to express each kind of measurement. You may circle more than one answer for each item.

2. Volume of a solid: mL m^3 cm^3 L6. Mass: kg K cm^3 mg3. Volume of a liquid: mL mg cm^3 L

7. Time: kg K s mm

4. Density of a material: g g/cm^3 kg/m^3 L

8. Length: K km m cm

5. Temperature: $^{\circ}K$ K $^{\circ}C$ Kg

$$D = \frac{\text{Mass}}{\text{Vol.}} = \frac{g}{cm^3/ml}$$

For each pair of equations, write the letter of the equation that expresses an equal value.

a 9. a. 1 L = 1 dm^3 b. 1 L = 1 cm^3 a 10. a. 1 mL = 1 cm^3 b. 1 cm^3 = 1 Lb 11. a. $0^{\circ}C$ = $-273 K$ b. 0 K = $-273^{\circ}C$ b 12. a. 1 kg = 100 g

b. 1000 g = 1 kg

a 13. a. 400 cm = 4.0 m

b. 400 cm = 0.40 m

b 14. a. 1 dm = 10 m

b. 1 dm = 0.10 m

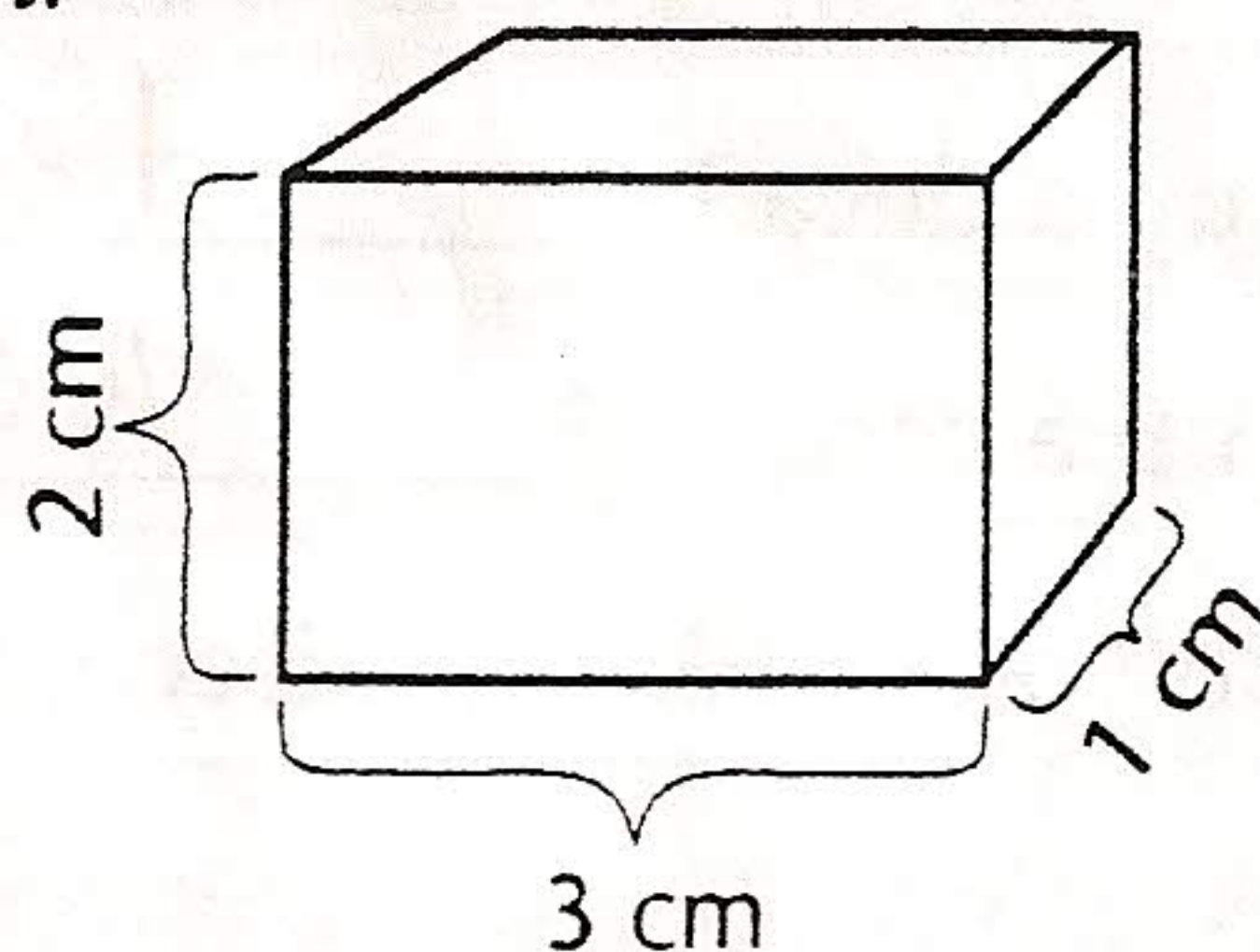
a 15. a. $100^{\circ}C$ = 373 Kb. 373 K = $10^{\circ}C$

$$C + 273 = K$$

$$K - 273 = C$$

16. Calculate the volume of the box in the diagram.

$$\text{Vol.} = 6 \text{ cm}^3$$



Chapter 2

CHAPTER REVIEW

● Physical Science Methods

B-11

Part A. Vocabulary Review

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

graph
~~Kilogram~~
~~meter~~

volume
liters

mass
density
standard

derived

seconds

Kelvin

measurement

time

1. A visual display of information or data is a *hagrp*.
2. The basic unit of mass in SI is the *groilkam*.
3. The basic unit of length in SI is the *treem*.
4. The amount of space an object occupies in its *muleov*.
5. Liquid volumes are often measured in either cubic centimeters or *sliert*.
6. A measure of the amount of matter in an object is *sams*.
7. A measure of the amount of mass per unit volume of a material is *sitendy*.
8. An exact quantity that people agree to use for comparison is called a *drastand*.
9. Units of measurement that are obtained by combining other units are called *drivede* units.
10. In SI, time is measured in *deconss*.
11. The temperature scale used in SI is the *vinelk* scale.
12. SI is the standard system of *meterasumen* used worldwide.
13. The interval between two events is *emit*.

Match each prefix used in SI in Column I with its meaning in Column II. Write the letter of the correct meaning in the blank on the left.

Column I

Column II

f 14. kilo-

a. 0.001

b 15. centi-

b. 0.01

a 16. milli-

c. 0.1

c 17. deci-

d. 10

e 18. hecto-

e. 100

d 19. deka-

f. 1000

Chapter 2 Review (continued)

Part B. Concept Review

John counted the number of leaves that fell from a tree for a five-day period. John used a graph to show his data. Use John's graph to answer questions 1-6.

1. What type of graph did John use to display his data? line graph

2. What is the dependent variable on John's graph? number of leaves that fell

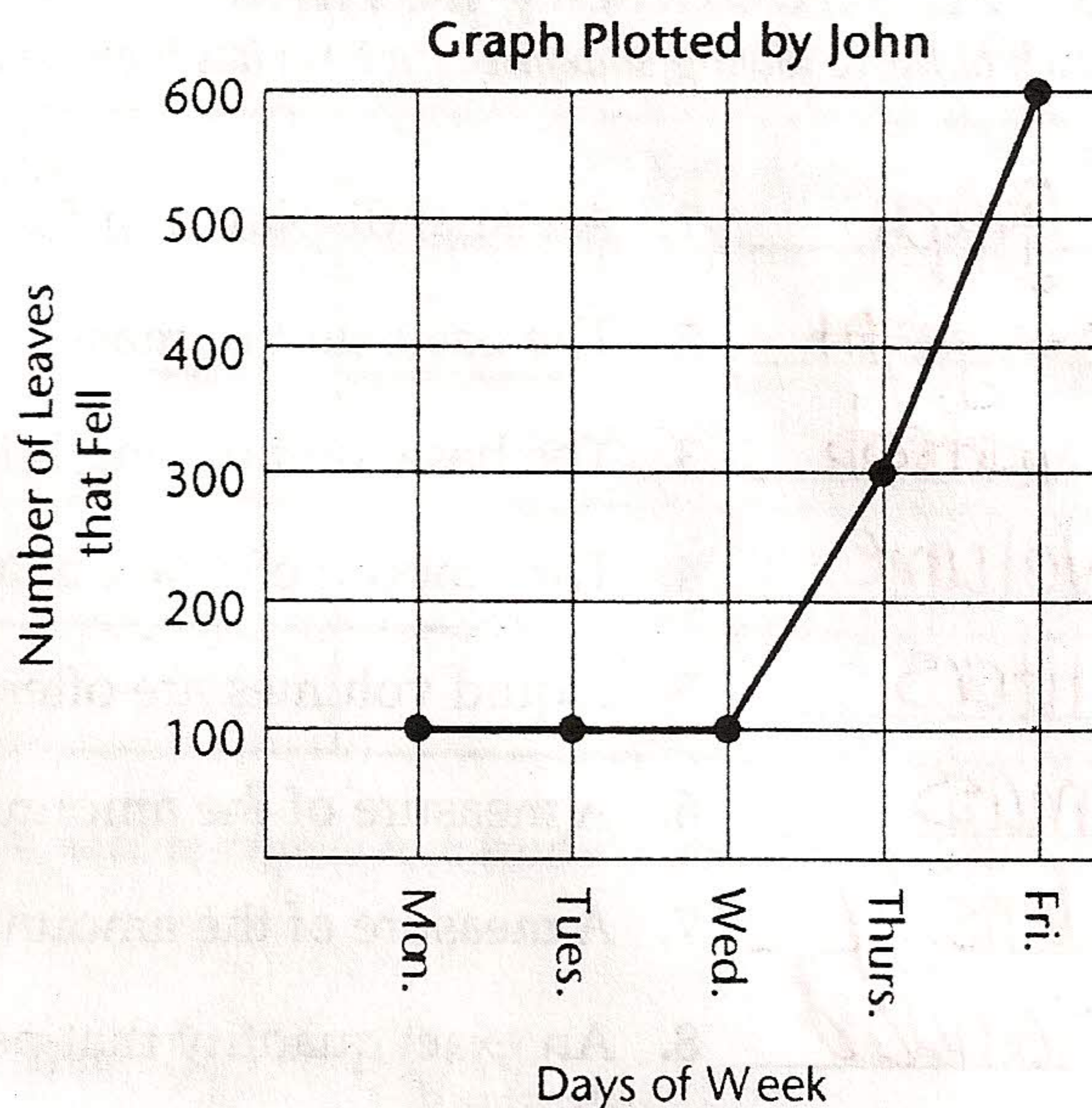
3. What is the independent variable on John's graph? days of week

4. On which day of the week did the greatest number of leaves fall? Friday

5. On what days of the week did the number of leaves that fell remain constant?

Mon., Tue, Wed.

6. On what other kind of graph could this data be shown? bar graph



Convert the following.

7. 200 m = 0.2 km 10. 12 cm³ = 12 mL 13. 125 mm = 12.5 cm
 8. 1.2 L = 1200 mL 11. 10°C = 283 K 14. 12 000 mg = 12.0 g
 9. 0 K = -273 °C 12. 1 L = 1000 cm³

Answer the following questions in complete sentences on the lines provided.

15. Why are standards of measurement necessary?

16. How are SI units used in the United States?

17. Most of the countries in Europe use SI measurements. How could this be a problem if you went on a trip to Europe?

Chapter 2

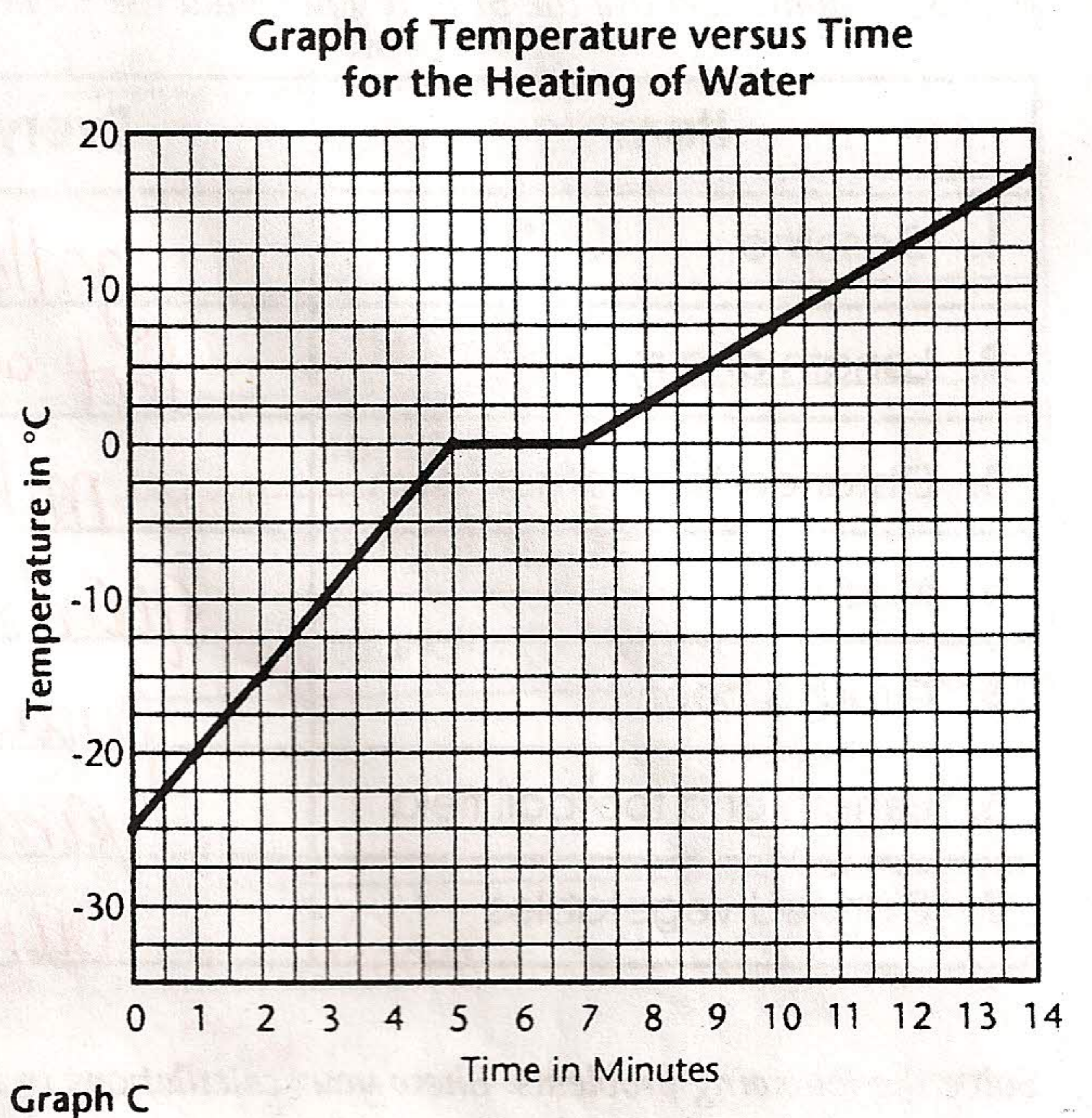
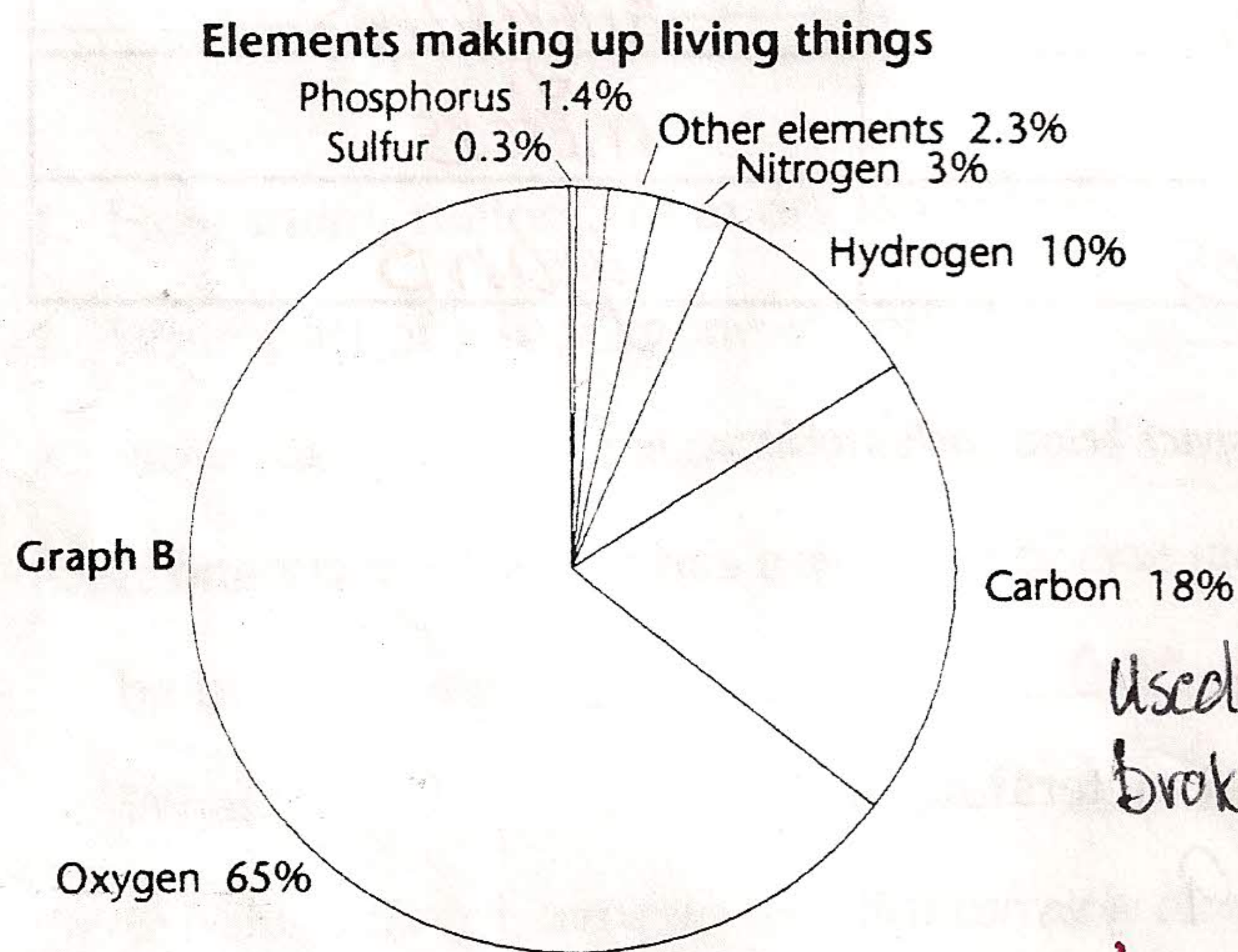
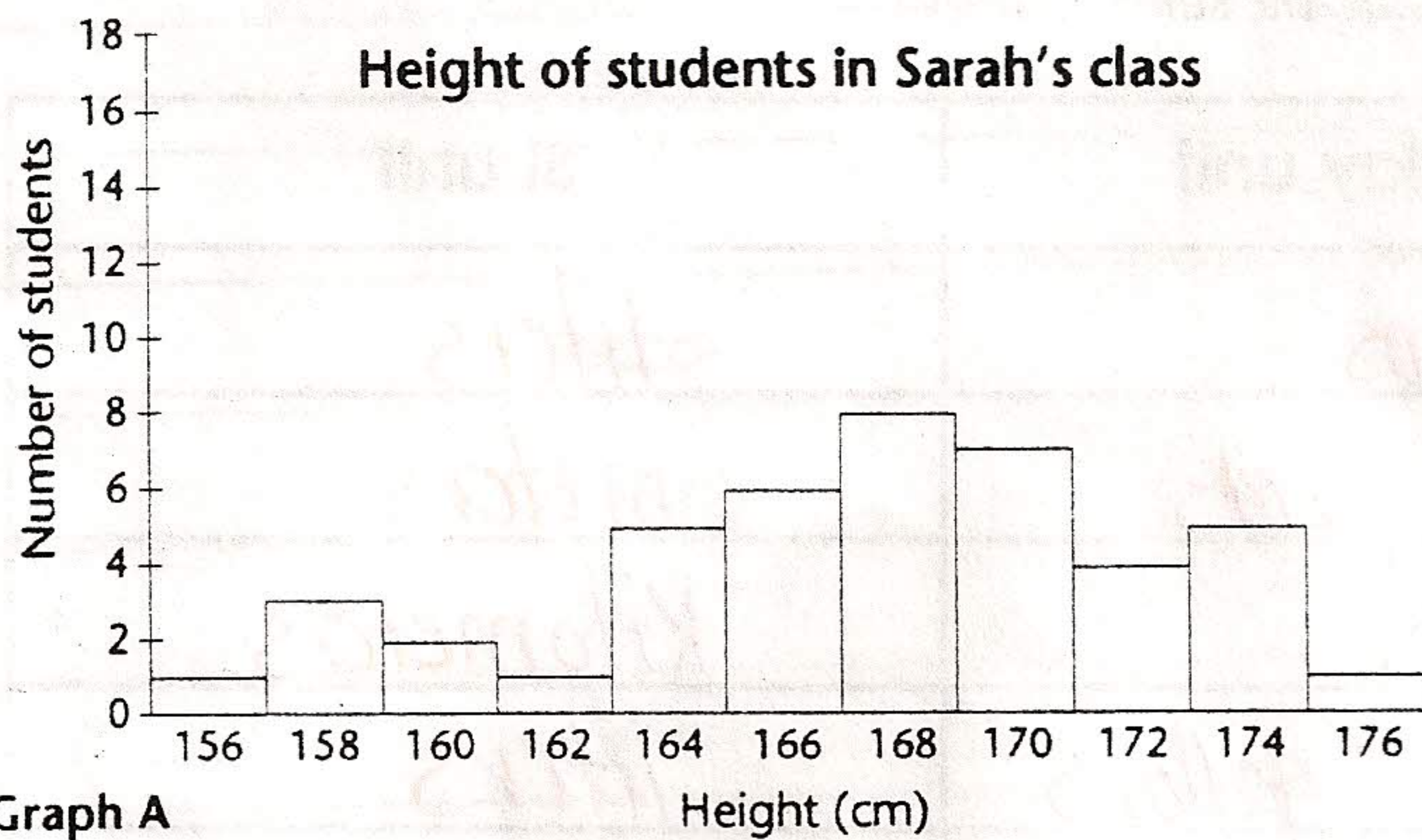
REINFORCEMENT

● Graphing

Use with Text Pages 48-51

Used to show how data changes over time "Trends"

Use the graphs below to answer the following questions.



- What type of graph is graph A? bar graph
- What information is shown on graph A? height of students in Sarah's class
- What height do the greatest number of students in Sarah's class have in common? 168 cm
- What type of graph is graph B? pie graph
- What information is shown in graph B? the percentage of elements making up living things
- What element makes up the largest part of living things? oxygen
- What type of graph is shown in C? line graph
- What does graph C show? temp. vs. time for heating water
- What is the dependent variable in graph C? temp.
- What is the independent variable in graph C? time
- On what axis is the independent variable plotted? horizontal axis
- On what axis is the dependent variable plotted? vertical axis

Chapter 2

REINFORCEMENT

Use with Text Pages 52-54

● SI for All?

In the second column of the table below, identify an everyday unit that you would use to measure each item listed. In the last column, identify the SI unit you would use to measure the same quantity.

Item	Everyday unit	SI unit
1. Gasoline	gallons	liters
2. Length of a room	feet or yards	meters
3. Distance to another town	miles	Kilometers
4. Milk	quarts or gallons	liters
5. Ground beef	pounds	Kilograms
6. Length of a football field	yards	meters
7. Canned vegetables	ounces	grams

Solve the following problems. Show your calculations in the space below each problem.

8. Sam is 75 inches tall. How tall is Sam in feet?

$$75 \text{ in} \left| \frac{1 \text{ ft}}{12 \text{ in}} \right| = 6.25 \text{ ft}$$

9. Sam is 190.5 centimeters tall. How tall is Sam in meters?

$$190.5 \text{ cm} \left| \frac{1 \text{ m}}{100 \text{ cm}} \right| = 1.9 \text{ m}$$

10. One pound of ground beef costs \$2.69. What is the cost of ground beef per ounce?

$$\frac{2.69 \$}{1 \text{ lb}} \left| \frac{1 \text{ lb}}{16 \text{ oz}} \right| = 16.8 \text{ \$/oz}$$

11. One kilogram of ground beef costs \$1.22. What is the cost of the ground beef per gram?

$$\frac{1.22 \$}{1 \text{ kg}} \left| \frac{1 \text{ kg}}{1000 \text{ g}} \right| = .00122 \text{ \$/g}$$

Answer the following question.

12. Is it easier to convert from one unit to another using everyday units or using SI units?

Explain your answer. probably SI, you only need to move
the decimal in many cases

Chapter 2

STUDY GUIDE

Use with Text Pages 34-37

● Standards of Measurement

B-12

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 1/1000
- How many grams are in two dekagrams? 20g
- 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 ____.

Chapter 2

STUDY GUIDE

Use with Text Pages 38-47

● Using SI Units

20

B-12

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>I</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.

16. Celsius degree, mass, kelvin units of temp.

17. balance, second, mass units of mass

18. kilogram, liter, cubic centimeter units of volume

19. time, second, distance units of time

20. decimeter, kilometer, kelvin the decimeter and kilometer are units of length.