

CHAPTER 2 STUDY GUIDE

Analyzing Data

Section 2.1 Units and Measurement

In your textbook, read about SI units.

Complete the following table.

SI Base Units		
Quantity	Base unit	Unit abbreviation
1. Time	Second	s
2. Mass	Kilogram	Kg
3. Temperature	kelvin	K
4. Length	meter	m

In your textbook, read about base units and derived units.

For each SI unit in Column A, write the letter of the matching item from Column B.

- | Column A | Column B |
|-------------------------|--|
| <u>B</u> 5. second | a. A platinum-iridium cylinder that is stored at constant temperature and humidity |
| <u>D</u> 6. meter | b. The microwave frequency given off by a cesium-133 atom |
| <u>A</u> 7. kilogram | c. A cube whose sides all measure exactly one meter |
| <u>C</u> 8. cubic meter | d. The distance that light travels through a vacuum in 1/299 792 458 second |

9. Use Table 2-2 in your textbook to arrange the following prefixes in order from largest to smallest.

centi- giga- kilo- mega- milli- nano- pico-
giga- mega- kilo- centi- milli- nano- pico

10. List the symbols and factors that the following prefixes represent.

- a. centi- C 1/100
- b. kilo- K 1000
- c. milli- m 1/1000

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

Section 2.1 *continued*

Answer the following questions.

11. Which temperature scale will you use for your experiments in this class? Is this an SI unit?

Celsius; NO, The SI unit for temp is Kelvin

12. How many grams are in a kilogram?

1000 g

13. How many liters are in a megaliter?

1,000,000 L

14. How many centimeters are in a meter?

100cm

15. What is the difference between a base unit and a derived unit?

Base units are defined units based on specific objects or events in the physical world. Derived units are defined by combining base units

16. What is density?

Density is a ratio that compares the mass of an object to its volume.

17. Explain in terms of density why a grocery bag containing all canned goods is harder to lift than a grocery bag containing all paper goods.

Canned goods are more dense than paper goods. They have more mass per unit volume.

18. How can you obtain an object's volume if you know its density and its mass?

$$D = m/V$$

$$* V = m/D *$$

19. What is the three-part process for problem solving?

Analyze, solve, + evaluate

20. How are degrees Celsius converted to kelvins?

add 273 to degrees Celsius

Section 2.2 Scientific Notation and Dimensional Analysis

In your textbook, read about scientific notation.

1. Circle the figures that are written in scientific notation.

1.61×10^2

$1.61 \times 10 \times 10$

1.61×100

161 km

1.62762×10^{-27} kg

9.10939×10^{-31} kg

2.8×10^{-8}

1,380,000

2. Change the following data into scientific notation.

a. 5,000,000 km 5×10^6 km

c. 0.000421 g 4.21×10^{-4} g

b. 8,394,000,000 s 8.394×10^9 s

d. 0.03 cm 3×10^{-2} cm

In your textbook, read about dimensional analysis.

Answer the following questions.

3. What is a conversion factor?

A ratio of equivalent values used to express the same quantity in different units (12 inches = 1 foot)

4. What is dimensional analysis?

A method of problem solving that often uses conversion factors

Complete the following dimensional analysis problems.

5. Convert 50 kilograms into grams.

$50 \text{ kg} \times 1000 \text{ g} / 1 \text{ kg} = 50,000 \text{ g}$

6. Convert 5 meters into centimeters.

$5 \text{ m} \times 100 \text{ cm} / 1 \text{ m} = 500 \text{ cm}$

7. Convert 5 liters into kiloliters.

$5 \text{ L} \times 1 \text{ kL} / 1000 \text{ L} = 0.005 \text{ kL}$

8. Convert 5 centimeters into meters.

$5 \text{ cm} \times 1 \text{ m} / 100 \text{ cm} = 0.05 \text{ m}$

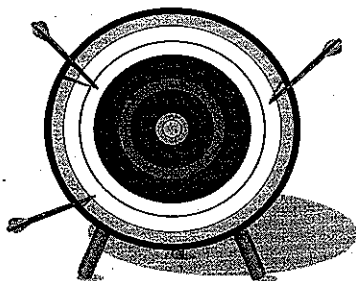
9. Convert 55 kilometers per hour into meters per second. Use the conversion factor 1 km = 1000 m.

$55 \text{ km/h} \times 1000 \text{ m} / 1 \text{ km} \times 1 \text{ hr} / 60 \text{ min} \times 1 \text{ min} / 60 \text{ sec} = 15 \text{ m/s}$

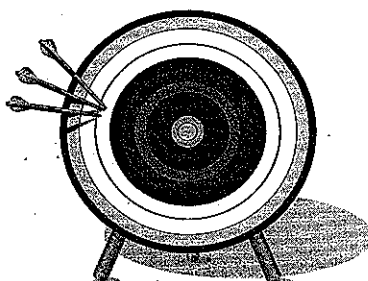
Section 2.3 Uncertainty in Data

In your textbook, read about accuracy and precision.

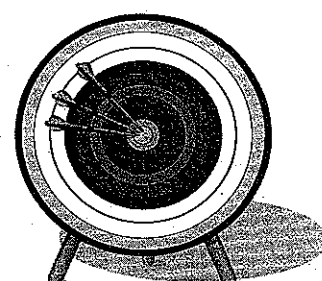
1. Use the terms *precise* and *accurate* to describe the following figures. You may use both terms for some figures. If a term does not apply to a figure, leave the space blank.



a. _____



b. Precise



c. Accurate
Precise

Circle the letter of the choice that best completes the statement or answers the question.

2. The difference between an accepted value and an experimental value is called a(n)

a. error. c. measured value.
 b. percent error. d. precise measurement.

3. The ratio of an error to an accepted value is called a(n)

a. accuracy-to-precision value. c. percent error.
 b. accuracy. d. precision.

4. When you calculate percent error, you can ignore the

a. accepted values. c. experimental values.
 b. measured values. d. plus and minus signs.

5. If two measurements are very close to each other, then they are

a. accurate. c. both accurate and precise.
 b. precise. d. accepted values.

6. Which of the following is most likely to produce data that are not precise?

a. a balance that is not set to zero
 b. not reading a graduated cylinder at eye level
 c. altering the procedure during an experiment
 d. making the same error with each trial

CHAPTER 2 STUDY GUIDE

Section 2.3 continued

In your textbook, read about significant figures.

Use each of the terms below just once to complete the statements.

counting numbers	estimated	non-zero	zeros
scientific notation	significant figures	placeholders	

7. The digits that are reported in an answer are called Significant Figures
8. The numeral 9.66 has three significant figures, two known figures and one estimated figure.
9. Non-zero numbers are always significant.
10. All final Zero's to the right of the decimal place are significant.
11. Zeros that act as placeholders are not significant.
12. Counting Numbers have an infinite number of significant figures.
13. When you convert to Scientific notation you remove the placeholder zeros.

In your textbook, read about rounding off numbers.

14. Round the following to four significant figures.

a. 12.555 km <u>12.56 km</u>	b. 1.0009 <u>1.001</u>	c. 99.999 <u>100.0</u>	d. 23.342999 <u>23.34</u>
------------------------------	------------------------	------------------------	---------------------------
15. Round 12.783 456 to the requested number of significant figures.

a. 2 significant figures <u>13</u>	c. 6 significant figures <u>12.7835</u>
b. 5 significant figures <u>12.783</u>	d. 7 significant figures <u>12.78346</u>
16. Round 120.752416 to the requested number of significant figures.

a. 3 significant figures <u>121</u>	c. 5 significant figures <u>120.75</u>
b. 4 significant figures <u>120.8</u>	d. 7 significant figures <u>120.7524</u>
17. Complete the following calculations. Round off the answers to the correct number of significant figures.

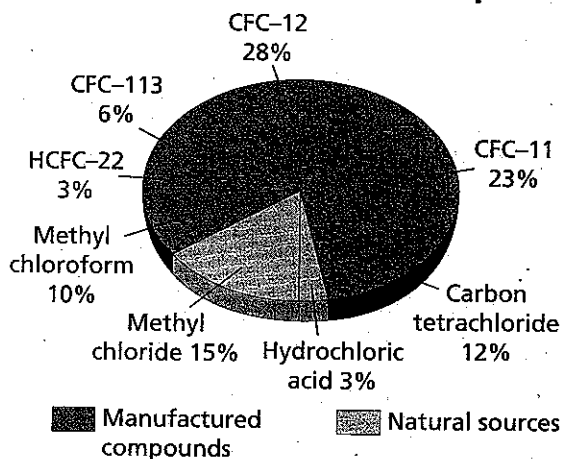
a. 51.2 kg + 64.44 kg <u>115.6 Kg</u>	
b. 6.435 cm - 2.18 cm <u>4.25 cm</u>	
c. 16 m × 2.82 m × 0.05 m <u>2 m³</u>	
d. 3.46 m/1.82 s <u>1.90 m/s</u>	

Section 2.4 Representing Data

In your textbook, read about graphing.

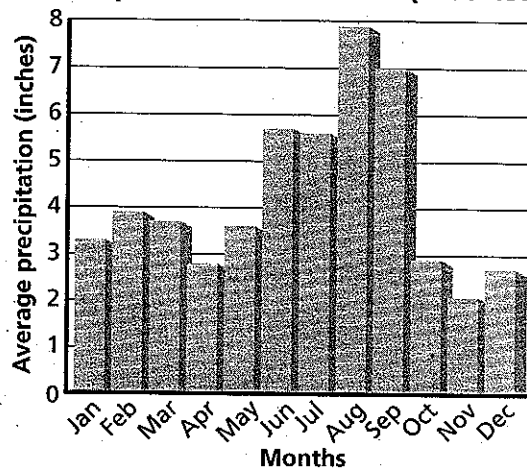
Label each kind of graph shown.

1. Sources of Chlorine in the Stratosphere



Circle Graph

2. Precipitation in Jacksonville (1961–1990)



Bar Graph

Answer the following questions about the graphs.

3. What percent of the sources of chlorine in the stratosphere are CFCs? 60%

4. During which month of the year does Jacksonville usually get the most precipitation?
The least?

August, November

In your textbook, read about line graphs.

Sequence the following steps. Write 1 beside the first step in plotting a line graph. Write 2 beside the second step, and so on.

- 7 5. Give the graph a title.
- 3 6. Choose the ranges for the axes.
- 1 7. Identify the independent and dependent variables.
- 5 8. Plot the data points.
- 2 9. Determine the range of the data that needs to be plotted for each axis.
- 6 10. Draw the "best fit" line for the data.
- 4 11. Number and label each axis.

Analyzing Data

Reviewing Vocabulary

Match each term in Column A with its definition in Column B.

Column A

- D 1. base unit
4 + D 2. derived unit
4 3. graph
5 4. scientific notation
C 5. accuracy
B 6. conversion factor
i 7. dimensional analysis
6 8. kelvin
C 9. percent error
A 10. precision

Column B

- a. Refers to how close a series of measurements are to one another
 b. A ratio of equivalent values used to express the same quantity in different units
 c. The ratio of an error to an accepted value
 d. A defined unit in a system of measurement that is based on an object or event in the physical world
 e. Refers to how close a measured value is to an accepted value
 f. A unit in a system of measurement that is defined by combining base units
 g. The SI base unit of temperature
 h. A means of expressing numbers as a multiple of two factors: a number between 1 and 10; and ten raised to a power, or exponent
 i. A method of problem-solving that focuses on the units used to describe matter, often using conversion factors
 j. A visual display of data that may include plotting data on x - and y -axes

Use the following terms to complete the statements.

density

liter

kilogram

significant figures

meter

second

11. The SI base unit of time is the second.
 12. The SI base unit for length is the meter.
 13. The SI base unit for mass is the Kilogram.
 14. The SI derived unit for volume is the liter.
 15. Density is a ratio that compares the mass of an object to its volume.
 16. Significant Figures include all known digits plus one estimated digit.