

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.		s
2. Mass		
3.	kelvin	
4. Length		

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

- _____ 5. second
 _____ 6. meter
 _____ 7. kilogram
 _____ 8. cubic meter

Column B

- a. A platinum-iridium cylinder that is stored at constant temperature and humidity
 b. The microwave frequency given off by a cesium-133 atom
 c. A cube whose sides all measure exactly one 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-

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

- a. centi- _____
 b. kilo- _____
 c. milli- _____

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continued

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?

12. How many grams are in a kilogram?

13. How many liters are in a megaliter?

14. How many centimeters are in a meter?

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

16. What is density?

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.

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

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

20. How are degrees Celsius converted to kelvins?

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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

$1.627\ 62 \times 10^{-27}$ kg

$9.109\ 39 \times 10^{-31}$ kg

2.8×10^{-8}

1,380,000

- 2.**
- Change the following data into scientific notation.

a. 5,000,000 km _____

c. 0.000421 g _____

b. 8,394,000,000 s _____

d. 0.03 cm _____

*In your textbook, read about dimensional analysis.***Answer the following questions.**

- 3.**
- What is a conversion factor?

- 4.**
- What is dimensional analysis?

Complete the following dimensional analysis problems.

- 5.**
- Convert 50 kilograms into grams.

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

- 6.**
- Convert 5 meters into centimeters.

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

- 7.**
- Convert 5 liters into kiloliters.

$5 \text{ _____} \times 1 \text{ _____} / 1000 \text{ _____} = 0.0005 \text{ _____}$

- 8.**
- Convert 5 centimeters into meters.

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

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

$55 \text{ _____} / \text{_____} \times 1000 \text{ _____} / 1 \text{ _____} \times 1 \text{ _____} / 60 \text{ _____}$
 $\times 1 \text{ _____} / 60 \text{ _____} = 15 \text{ _____}$

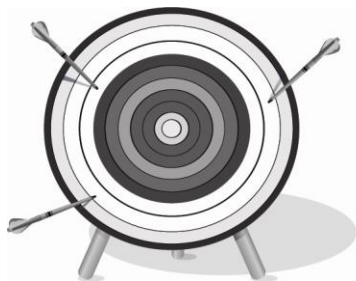
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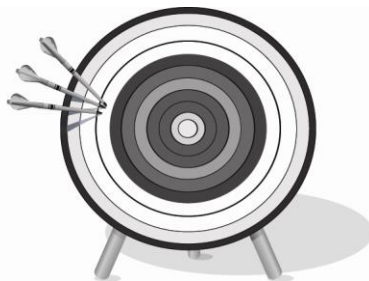
Section 2.3 Uncertainty in Data

In your textbook, read about accuracy and precision.

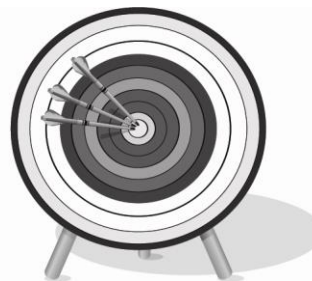
1. Use the terms *precise* and *accurate* to describe the following figures. You may use both terms for some figures. If a term does not apply to a figure, leave the space blank.



a. _____



b. _____



c. _____

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.
 - b. percent error.
 - c. measured value.
 - d. precise measurement.
3. The ratio of an error to an accepted value is called a(n)
- a. accuracy-to-precision value.
 - b. accuracy.
 - c. percent error.
 - d. precision.
4. When you calculate percent error, you can ignore the
- a. accepted values.
 - b. measured values.
 - c. experimental values.
 - d. plus and minus signs.
5. If two measurements are very close to each other, then they are
- a. accurate.
 - b. precise.
 - c. both accurate and 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

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continued

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	

- The digits that are reported in an answer are called _____.
- The numeral 9.66 has three significant figures, two known figures and one _____ figure.
- _____ numbers are always significant.
- All final _____ to the right of the decimal place are significant.
- Zeros that act as _____ are not significant.
- _____ have an infinite number of significant figures.
- When you convert to _____, you remove the placeholder zeros.

In your textbook, read about rounding off numbers.

- Round the following to four significant figures.
 - 12.555 km _____
 - 1.0009 _____
 - 99.999 _____
 - 23.342999 _____
- Round 12.783456 to the requested number of significant figures.
 - 2 significant figures _____
 - 5 significant figures _____
 - 6 significant figures _____
 - 7 significant figures _____
- Round 120.752416 to the requested number of significant figures.
 - 3 significant figures _____
 - 4 significant figures _____
 - 5 significant figures _____
 - 7 significant figures _____
- Complete the following calculations. Round off the answers to the correct number of significant figures.
 - $51.2 \text{ kg} + 64.44 \text{ kg}$ _____
 - $6.435 \text{ cm} - 2.18 \text{ cm}$ _____
 - $16 \text{ m} \times 2.82 \text{ m} \times 0.05 \text{ m}$ _____
 - $3.46 \text{ m}/1.82 \text{ s}$ _____

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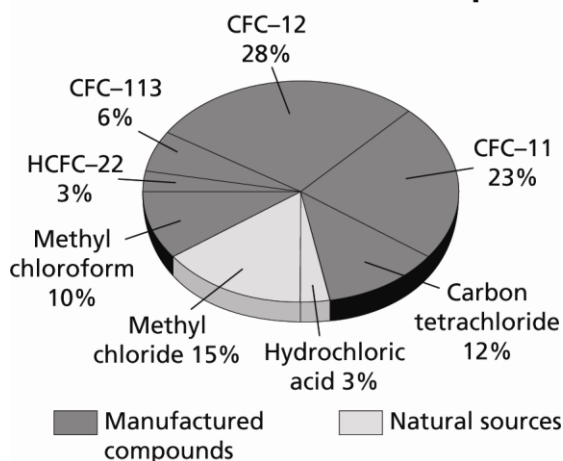
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Section 2.4 Representing Data

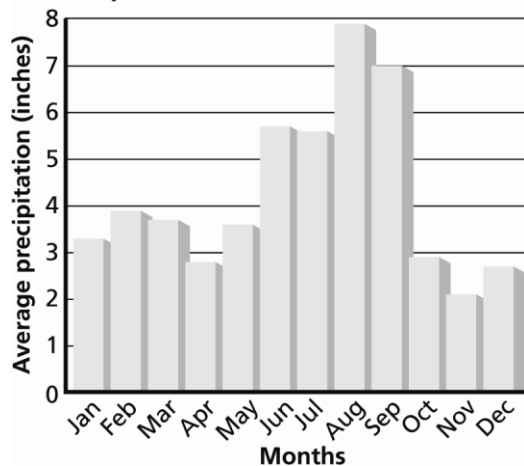
In your textbook, read about graphing.

Label each kind of graph shown.

1. Sources of Chlorine in the Stratosphere



2. Precipitation in Jacksonville (1961–1990)



Answer the following questions about the graphs.

- What percent of the sources of chlorine in the stratosphere are CFCs? _____
- During which month of the year does Jacksonville usually get the most precipitation? The least?

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.

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