Name _____ Date _____ Class _____

CHAPTER 2 CHAPTER ASSESSMENT

Data Analysis

Reviewing Vocabulary

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

Column A	Column B
_____ **1.** base unit	**a.** Refers to how close a series of measurements are to one another
_____ **2.** derived unit	**b.** A ratio of equivalent values used to express the same quantity in different units
_____ **3.** graph	**c.** The ratio of an error to an accepted value
_____ **4.** scientific notation	**d.** A defined unit in a system of measurement that is based on an object or event in the physical world
_____ **5.** accuracy	**e.** Refers to how close a measured value is to an accepted value
_____ **6.** conversion factor	**f.** A unit in a system of measurement that is defined by combining base units
_____ **7.** dimensional analysis	**g.** The SI base unit of temperature
_____ **8.** kelvin	**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
_____ **9.** percent error	**i.** A method of problem-solving that focuses on the units used to describe matter, often using conversion factors
_____ **10.** precision	**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 _____.

12. The SI base unit for length is the _____.

13. The SI base unit for mass is the _____.

14. The SI derived unit for volume is the _____.

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

16. _____ include all known digits plus one estimated digit.

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Understanding Main Ideas (Part A)

In the space at the left, write *true* if the statement is true; if the statement is false, change the italicized word or phrase to make it true.

_____ **1.** In an answer that has four significant figures, *two are estimated and two are known*.

_____ **2.** The liter is *the base unit of density*.

_____ **3.** The prefix deci- indicates a *larger* number than the prefix centi-.

_____ **4.** The number 1 234 000 in scientific notation is equal to 1.234×10^5.

Answer the following questions. Show your work when a calculation is needed.

5. You live 6 kilometers from your school. How many meters do you live from school?

6. How many seconds are there in a millisecond?

7. How many nanograms are in 34 g?

8. Solve the following problem: $(2 \times 10^9) \times (5 \times 10^5)$.

9. Solve the following problem: $(12 \times 10^9) \div (6 \times 10^5)$.

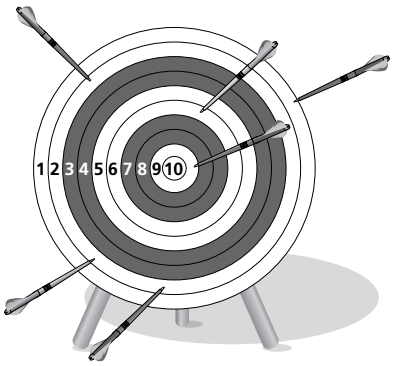
10. Convert 100 km/h to m/s.

11. Add: $3 \times 10^9 + 5 \times 10^{10}$.

12. Subtract: $5.01 \times 10^{-7} - 30 \times 10^{-9}$

Understanding Main Ideas (Part B)

Circle the letter of the choice that best answers the question. Use the following figure for questions 1 and 2.



1. What can you conclude about the figure?

a. The arrow locations represent precision.

b. The arrow locations represent both high accuracy and good precision.

c. The arrows have been thrown accurately toward the bulls-eye.

d. The arrow locations represent neither accuracy nor precision.

2. What can you conclude about the figure?

a. To be accurate, all the arrows would have to be inside the ring labeled 2.

b. To be precise, half of the arrows would need to be inside the ring labeled 9.

c. To be accurate, all the arrows would need to be near the ring labeled 10.

d. It is not possible to be both accurate and precise at the same time.

3. You calculate that 213 000 m/s is the answer to a problem. What can you conclude about your answer?

a. It has six significant figures.

b. It has three significant figures.

c. It's not possible to know how many significant figures are in an answer without knowing its accepted value.

d. It is not possible to know how many significant figures are in an answer without knowing its percent error.

4. You calculate that 215 000 g is the answer to a problem. You are asked to write your answer in scientific notation. What can you conclude about your answer?

a. It has six significant figures.

b. You should round the 1 up to 2 because it is followed by a 5.

c. The answer is too small to be written in scientific notation.

d. It has three significant figures.

5. You calculate that 319 000 000 m is the answer to a problem. You are asked to write your answer in scientific notation. Which answer is correct?

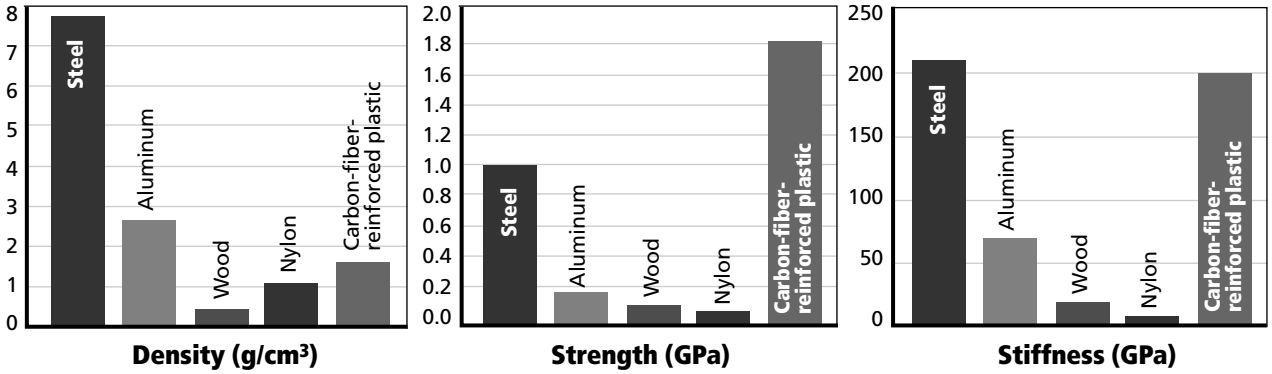
a. 3.19×10^{8} **b.** 31.9×10^{10} **c.** 32×10^{10} **d.** both b and c

6. You calculate the following answer to a problem: 12.655 cm. You are asked to round your answer to four significant figures. Which answer is correct?

a. 12.66 cm **b.** 12.65 cm **c.** 12.60 cm **d.** 12.70 cm

Thinking Critically

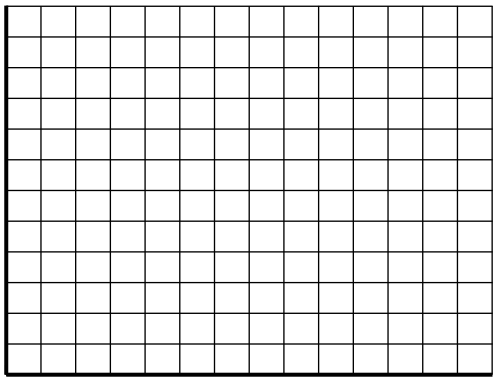
A tennis racket needs to be both strong and stiff. But it also needs to be lightweight. Tennis rackets can be made of a number of different materials. The graphs below show some of the advantages and disadvantages of different materials that are used in tennis racket frames. Use the graphs to answer the questions.



1. Which material is the strongest? _____

2. Which material is the stiffest? _____

3. Aluminum, steel, and wood all cost about the same. Nylon costs twice as much as aluminum, steel, and wood. Carbon-fiber-reinforced plastic costs three times as much as aluminum, steel, and wood. Make a graph to present the relative cost of these materials.



4. Is steel a good material for a tennis racket frame? Explain your answer.

_____

5. Assume that you have no limit on the amount of money you can spend on a tennis racket. What kind of racket would you buy? Explain your answer.

_____

_____

_____

Applying Scientific Methods

A chemistry student is given the task of analyzing three unknown samples. Her data is listed in Data Table 1. Use Data Table 1 to answer the questions below.

Data Table 1

Trial	Sample A		Sample B		Sample C	
	Mass (in grams)	Volume (in mL)	Mass (in grams)	Volume (in mL)	Mass (in grams)	Volume (in mL)
Trial 1	80.72	10.01	95.41	10.72	72.28	10.00
Trial 2	80.64	10.00	92.33	10.51	72.32	9.99
Trial 3	80.91	10.05	93.78	10.62	72.34	9.95
Average	80.76	10.02	93.84	10.62	72.30	9.98

1. Based on the data given, what is the density of each sample? Follow the rules for significant figures and rounding for your answers.

Sample A _____

Sample B _____

Sample C _____

2. Compare the data collected for each trial and each sample in Data Table 1. Which sample(s) did the student measure precisely? Explain your answer.

_____

_____

3. The student compares her data to the following chart in the back of her textbook. Can she identify Samples A, B, and C based on the data she recorded?

Table A Properties of Common Metals

Name	Color at room temperature	Density (g/cm^3)
Aluminum	Silver metal	2.701
Copper	Red metal	8.92
Iron	Silver metal	7.86
Nickel	Silver metal	8.90
Tin	White metal	7.28

_____

_____

_____

_____

Applying Scientific Methods, *continued*

4. What information would you suggest the student obtain so that she can more accurately identify the samples?

5. Assume that Sample A is copper, Sample B is nickel, and Sample C is tin. What is the percent error of the student's data?

6. What kind of graph would best compare the densities of the three samples? Explain your answer.

7. Assume that Sample A is copper, Sample B is nickel, and Sample C is tin. Which sample(s) did the student measure accurately? Explain your answer. What does this tell you about conclusions drawn from the data?

8. What advice would you give this student to produce more precise and accurate data next time?