**Ch 1: Matter, Measurement, Problem Solving Name:**

*1.1 Atoms and Molecules*

Water and hydrogen \_\_\_\_\_\_\_\_\_\_\_\_\_ only differ by one \_\_\_\_\_\_\_\_\_\_ atom. How does this change affect properties?

*1.2 The Scientific Approach to Knowledge (Read this section to review the scientific method.)*

What did Dalton’s atomic theory propose?

Why is his theory important for the physical world?

*1.3 The Classification of Matter*

Matter occupies \_\_\_\_\_\_\_\_\_\_ and has \_\_\_\_\_\_\_\_. How is matter (substance) classified?

How is diamond similar/different than glass?

***Know:*** How solids, liquids, and gases compare to each other. (macro and micro scale)

How to classify matter (pg7).

In lab you produce an insoluble precipitate (fine solid) during a chemical reaction between 2 solutions.

Would you use decantation or filtration to separate the precipitate from the remaining solution? Why?

Vodka (basically a mixture of water and ethanol) is distilled to increase the ethanol content (proof).

What property allows this to occur? (Figure 1.5)

*1.4 Physical and Chemical Changes and Physical and Chemical Properties (Read this section carefully)*

It is often difficult to determine if a change is chemical or physical. For a *chemical* change to occur a *NEW* substance with new properties must form. (Figure 1.8)

*Practice 1.1 (use PC, CC, PP, CP) a)\_\_\_\_ b) \_\_\_\_ c)\_\_\_\_ d)\_\_\_\_*

*Conceptual Connection 1.3* Explain why diagrams “b” and “c” are incorrect.

*1.5 Energy*

Define energy:

Work = \_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_ Energy can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

What are the 2 principles to note about energy?

Where does chemical potential energy arise from?

Where does most of the energy from the combustion of gasoline end up?

*1.6 The Units of Measurement*

Review the SI units in Table 1.1 *Read how each is defined. Note: the kg is no longer defined by the metal cylinder.*

How was the Fahrenheit scale originally determined?

Why is the Celsius scale so much easier?

What does it mean to say that Kelvin is an absolute scale? *Note: Kelvin does not use the degree symbol.*

*Conceptual Connection 1.5 \_\_\_*

*Practice 1.2 a,b Show your work.*

Review Table 1.2 *Note: the prefixes hecto-(100) and deca-(10) have been omitted from this table.*

*Conceptual Connection 1.* \_\_\_\_\_\_\_\_\_\_\_

How are L and mL defined in terms of centimeters?

*Table 1.3 Note: It is good to be familiar with basic conversions between common units.*

Define density in your own words.

Why is density intensive while mass and volume are extensive?

*Practice 1.3 and More Practice 1.3*

*Conceptual Connection 1.7* ­­­\_\_\_\_

*Chemistry and Medicine Bone Density* How is bone density determined?

*1.7 The Reliability of a Measurement*

What does it mean to say the first data set of CO concentration is more certain than the second one?

Why is the last digit in each of the readings in Figure 1.13 *uncertain*?

*Practice 1.4 \_\_\_\_\_\_\_\_\_\_ (don’t forget to include a unit!)*

What are significant figures?

Review the rules on page 22. Give 2 examples of “exact” numbers:

*Practice 1.5 a)\_\_\_\_ b) \_\_\_\_ c)\_\_\_\_ d)\_\_\_\_ e) \_\_\_\_ f)\_\_\_\_*

Review the rules for SigFigs in Calculations pg23-24

*Practice 1.6 a) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ d) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

Look at the data at the bottom of pg 25.

Why is the data for student A neither accurate or precise even though his average is close to the true mass of 10.00g?

Student B has fairly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ data but his data is not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. What do you think may have caused his masses to be consistent but low?

What can you say about Student C’s data?

Read *Chemistry in Your Day*

*1.8 Solving Chemical Problems*

What is dimensional analysis and how does it use conversion factors?

What must happen to the unit in the bottom of a conversion factor every time when completing the “math”?

Review the Strategy on pgs 28-29

*Practice 1.7 (I would prefer that you use 100cm =1m instead of 1cm = 10-2m because you don’t need exponents.)*

*Practice 1.8 (It is much easier to use 1000cm3 = 1L in this conversion along with 1gal =3.785L)*

*In Example 1.9 it would be much easier to use 1L =1000cm3 in place of the first 2 conversions in the solution.*

*More Practice 1.9*

*Practice 1.10 (again use 1L = 1000cm3 and 1kg =1000g in your conversions)*

*Practice 1.12*

*Exercises:* (pgs 40-45)#37, 41-44, 48, 50, 68, 72, 73, 78, 80, 87, 91, 95, 102, 104, 105, 106, 123, 129, 133, 139

*Show all your work when completing problems.*