Accelerated Chemistry Name Period Due

Chapter 3 Objectives

**Learning to Think: Problem Solving Strategies.**

Read chapter 3 sections 3.1-3.4 and answer the following questions:

1. List the three kinds of problems listed in the concept overview for this chapter:

 a. converting

 b. problems.

 c. converting

2. Using the metaphor of playing tennis and driving from Bellaire to Jacinto City, Texas, describe what they have in common with problem solving?

3. Using an equivalent measurement such as the ones bellow construct conversion factors. Bonus for solutions.

 A. If 23 zips = 190 woozles, 25 zips X = woozles.

 B. If 1000 mL = 1 L then 1250 mL X = L

 C. If 1 gram water = 1 mL 297 g of water X X = L

4. A 1 oC measurement on the Celsius scale is equivalent to a 1.8 oF increase on the Fahrenheight scale. What is the corresponding temperature increase on the Celsius scale if the temperature on the Fahrenheight scale changes 27 degrees?

5. If gold has a density of 19.3 grams per cm3, what is the mass of 7.43 cm3 of gold?

6. Express the density of water, 1g/mL in the units of kg/m3.

7. What is the cost per pound of a box of cereal that sells for $3.98/ 25 oz. (16 oz. = 1 pound)

8. How much does the air in a 20oC classroom measuring 2.4 m X 10.1 m X 6.3 m weigh in kg? (pg. 46)

# Unit conversion vocab and notes Name Period

Chemistry is an experimental science aimed at solving . And Problem Solving is a skill learned through

practice. The more you , the more you become proficient in solving problems.

To solve a problem, you will need an orderly thought process, a kind of mental roadmap which includes 5 steps. Think of the word **SLICE.**

1. **S**tate the Unknown. First think of what you are trying to solve, and what information is not .
2. **L**ist what is or given. With any model kit, the first step is to identify what parts you have. It is the same with a problem. By reading the word problem, you list what information you have available.
3. **I**dentify a solution. Based on the information that you have, and the things you are trying to find out, develop a

to solve the problem. Just as you would map out a route when taking a road trip, you figure out what will be the best way to solve the problem, including the type of equation, and what additional information will need.

1. **C**alculate. Use the equation you chose, and in the numbers. You may have to go to references for other information and you may have to convert values to get the final answer.
2. **E**valuate. Check your work then make sure the answer is in the form that was asked in the problem. (Remember to

 units and include units with the final answer.)

**Conversion factors** are ratios of different units of measurement. They are used in problem solving to express the answer in the correct format that was asked for.

Conversion factors within a system of measurement are either defined or they are exact values. To convert from feet to inches you multiply by the exact value of 12. (12 inches = 1 foot)

**Dimensional Analysis** is the use of units of measurement, or dimensions that are applied in some fashion to solve, or analyze, a problem. Dimensional Analysis uses the same 5-step method to solve a problem.

**Conversion Factors** are numbers and values used to ensure that the answer is in the correct dimension when you finalize an answer. There are tables of conversion factors published that are used for this purpose.

Generally, the conversion factor tables require you to multiply your dimension by a known value to get the correct unit of measurement. The table is another way of showing the ratio of dimensions in a more convenient format.

**Multi-step problems** use the same 5-step procedure to solve. It may take a longer amount of time to solve, because you may need to break the problem down to make it more manageable.

You may have to solve 2 separate problems to get the answer for the bigger problem. You may have to repeat some or all of the 5 steps until all the questions are answered

Sometimes you come across a complex unit of measurement that requires you to convert it to the answer that you need. You may have to multiply the unit several times by different conversion factors until you get the answer in the right units.

For example, to go from inches to meters you may have to convert from inches to feet, then from feet to meters. The two conversion factors can be multiplied together to get the right ratio for the answer.

Name i.d.# Date Period

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| **Chem** | **Chapter 2 Density** |
| **A** | **Practicing Problem Solving Technique** |

Procedure: Before beginning calculations, list data, which you are provided after “Given”, and the calculation which you wish to make after “To derive.” Do all work to left of the line dividing the page. Corrections will be made on the right side of the page (if needed). **Round answers to correct significant digits. Circle answers.**

PLEASE SHOW SET-UPS!

1. At 32 oC a 1 000.0 mL flask held 995 g. of water. At the same temperature the same flask held 800.0 g. of

 another liquid.

 a. What was the density of the water?

 Given: To derive:

 b. What was the density of the other liquid?

 Given: To derive:

 c. What was the specific gravity of the other liquid compared to water at 32oC?

 Given: To derive:

2. An irregularly shaped object is immersed in water contained in a graduated cylinder. The water is displaced

 (increases by) 15.0 mL. The object is then weighed and its apparent weight is determined to be 39.4 g.

 What is the density of this object?

 Given: To derive:

3. What is the density of an object if 83.6 grams of it occupies 14.3 mL of space?

 Given: To derive:

4. The density of copper is 8.9 g/cm3. How much volume would a length of copper wire weighing 117.0 g

 occupy?

 Given: To derive:

 5. How much would you expect a lead object measuring 8.00 inches x 4.00 inches x 3.00 inches to weigh in

 grams if the density of lead is approximately 11.3 g/cm3? **2.54 cm = 1 inch, 1 in3 = (2.54)3 cm3**

 Given: To derive:

 6. How much would 500.0 mL of mercury weigh if mercury has a specific gravity of 13.6?

 Given: To derive:

 7. Calculate the mass of a 1.00 gallon US container of ethyl alcohol. Its density is 0.790 g/mL.

 (1 gallon US =3.79L, 1 gallon UK = 4.55)

 Given: To derive:

 8. The density of carbon tetrachloride is 1.58 g/mL. How much would you have to measure out in a graduated

 cylinder for an experiment which required 36.0 g?

 Given: To derive:

 9. The density of uranite is 8.56 g/mL. How much would 4.6 x 10 5 mL of it weigh?

 Given: To derive:

10. A metal spoon is found to have a mass of 27.63 g. Its volume is 3.25 mL.

 a. What is the density of the metal?

 Given: To derive:

 b. Silver has a density of 10.5 g/mL. Is the spoon pure silver? State your argument for or against.

 Given: To derive:

11. What are some practical, commercial, forensic or analytical uses of this concept of specific gravity or density?