NAME: **HONORS CHEMISTRY**

SECTION: Unit 1 Review Sheet

After studying chapters 2-3, you should be able to:

- Convert between standard and scientific notation
- List and use the SI units of measurement for mass, length, time, and temperature.
- Express and convert quantities using the common SI prefixes.
- Distinguish between the accuracy and precision of a measurement.
- Identify the number of significant figures in a measurement.
- Indicate a measurement's uncertainty by using significant figures
- Apply the rules for significant figures in calculations to round off numbers correctly.
- Calculate the density of an object from experimental data.
- Calculate the percent error of an experimentally determined measurement.
- Use dimensional analysis to solve various types of problems.
- Convert between the Celsius and Kelvin temperature scales.
- Distinguish between the physical properties and chemical properties of matter.
- Compare and contrast the three main states of matter: solids, liquids and gases.
- Distinguish between the extensive and intensive properties of matter.
- Classify changes of matter as chemical or physical.
- Classify a sample of matter as a substance or a mixture; as homogeneous or heterogeneous.
- Explain the difference between an element and a compound.
- State the names and symbols of elements 1-10.
- Identify common pieces of lab apparatus.
- Explain the uses of distillation, filtration and chromatography.

Reminder: Programmable calculators may not be used on the test.

Problems for you to try:

1. Complete the following table:

Standard notation	Scientific notation
0.0027 cm	
	3.559×10^{-6} g
	8.74×10^{5} m
430100000000000 s	

2. List the following units from largest to smallest: meter, millimeter, kilometer, centimeter, picometer

3. Complete the following conversions. (Hint: use factor label)

   a) 1 km = _____ m = _____ mm = _____ pm

   b) 1 mg = _____ kg = _____ g = _____ μg

4. The "Green Monster" in Fenway Park is 315 feet from home plate down the left field line and 37 feet high. What are these distances in meters? Use dimensional analysis.

5. Each of five students used the same ruler to measure the length of the same pencil. They obtained the following data: 15.33 cm, 15.34 cm, 15.33 cm, 15.33 cm, 15.34 cm. The actual length of the pencil was 15.55 cm. Discuss the accuracy and precision of the students' measurements.

6. How many significant figures are in each of the following numbers?

a) 1837	e) 0.000014	i) 14.000
b) 3.14145×10^4	f) 302400	j) 60.0
c) 6005	g) 632	k) 6000
d) 0.08206	h) 8.732	l) 1200.43

7. Determine the value of each of the following expressions, with the correct number of significant figures.

a) 1.86/3.14

b) (200)(87.45)

c) 6.23 + 915 –1012.7

d) 4.30 + 29.1 + 100.3452

e) 36.516 + 0.00258 – 32.157

f) 4.51545/0.15

8. Complete the following table of densities. Use the correct number of significant figures in your answers. Show your work.

Material	Mass (g)	Volume (cm^3)	Density (g/cm^3)
X	16.0	2.0	
Y	17.8	2.0	
Z	2.7	3.4	

9. Are the following chemical properties or physical properties? Why? For each physical property, state whether it is extensive or intensive.

a) the melting point of lead

b) color of a solid

c) hardness of diamond

d) ability to burn in air

e) conductivity

f) width

g) luster

10. A student measures the melting point of ammonium acetate, $NH_4C_2H_3O_2$, as 117°C, but the literature value is 114°C. What is the percent error in the measurement?

11. Are the following chemical changes or physical changes? Why?
    a) melting of tin
    b) burning of natural gas
    c) rusting of iron
    d) baking bread in an oven
    e) bending a piece of wire

12. Use picture models to explain the differences between solids, liquids and gases.

13. Give two examples each of pure substances and mixtures. Explain the differences between pure substances and mixtures.

14. Compare the definitions of elements and compounds. Use picture-models to supplement your answer.

15. What is the difference between a homogeneous and a heterogeneous mixture? Use picture-models as part of your answer.

16. Which of the following are heterogeneous and which are homogeneous mixtures? Explain your answers.
    a) spaghetti sauce
    b) glass
    c) concrete
    d) cough syrup
    e) soda
    f) ink
    g) an egg
    h) blood

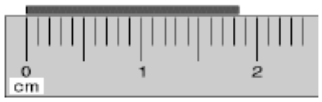
17. If your body temperature is 312 K, what is it on the Celsius scale? Show your work and include the appropriate formula.

18. The temperature outside is a balmy 28.5^{o}C. Convert it to the Kelvin scale. Show your work and include the appropriate formula.

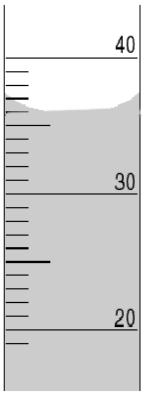
19. Sketch the following laboratory equipment: watch glass, Erlenmeyer flask, beaker, volumetric flask, crucible, evaporating dish

20. Distillation and filtration are important methods for separating the components of mixtures. Suppose you have a mixture of sand, salt and water. Describe how filtration and distillation could be used sequentially to separate this mixture into three separate components.

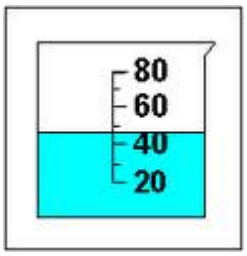
21. Read each of the following measurements.



____ cm



____ mL



____ mL

For additional practice on measurements with significant figures, go to:

http://antoine.frostburg.edu/chem/senese/101/tutorials/index.shtml
and complete the tutorial on Uncertainty in Measurement
(you may find some of the other tutorials and quizzes useful, as well)