Honors Chemistry 11

Summer Assignment – Chapters 1 & 2

Honors Chemistry 11 is a fast-paced, advanced chemistry course. It covers many concepts very quickly, usually one unit every two weeks. We will begin studying new concepts right away rather, therefore the summer assignment is meant to **review** chemistry concepts you mastered in Physical Science. It will also give you an idea of the level of math you should be comfortable doing, as well as the time commitment for this class.

This assignment will be due **the second day of class** and will be your first homework grade. Please complete on lined notebook paper and SHOW ALL WORK.

Chapter 1: Introduction: Matter, Energy, and Measurement

- Please read pp4-33 in your textbook
- Complete the assigned textbook questions (below) **that begin on p. 35**.
- Answer the **Ch. 1 Questions** at the bottom of this document.

Topic	Reading
1.1-1.2 Classification of Matter	pp 4-11
1.3 Properties of Matter	pp 12-14
1.4 Energy	pp 15-16
1.5-1.6 Units of Measurement and Uncertainty	pp 17-28
1.7 Dimensional Analysis	pp 18-33

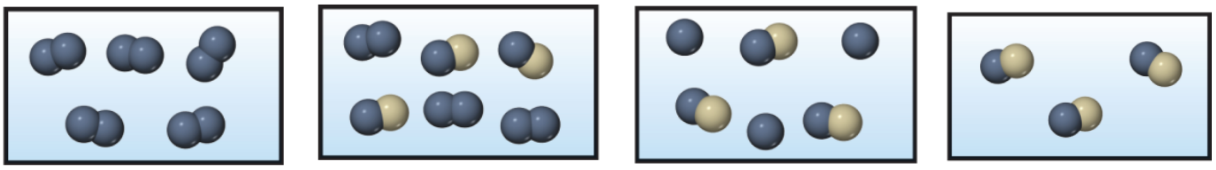
Chapters 1.1-1.2 Classification of Matter

1. Define the following terms:
   a) Matter
   b) Element
   c) Atoms
   d) Molecules

2. Draw a diagram of the molecular view of a solid, liquid, and gas. How do solids, liquids, and gases differ from one another?

Solid	Liquid	Gas

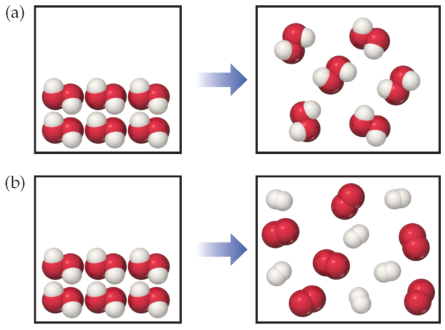
3. Classify each of the following diagrams as a pure element, a pure compound, or a mixture.



4. Classify the following as a pure substance or a mixture. If a mixture, indicate whether it is homogeneous or heterogeneous.
   a) air
   a) tomato juice
   b) iodine crystals
   c) sand

Chapters 1.3 Properties of Matter

5. Label the following diagrams as chemical or physical change. What makes them different?



6. You are hiking in the mountains and find a shiny gold nugget. It might be the element gold, but it also might be "fool's gold" also known as pyrite, FeS_2. Which of the following physical properties do you think would help determine if the shiny nugget is really gold– appearance, melting point, density, or physical state? Why?

7. In the process of attempting to characterize a substance, a chemist makes the following observations: The substance is a silvery white, lustrous metal. It melts at 649℃ and boils at 1105℃. Its density is 1.738 g/cm^3. The substance burns in air, producing an intense white light. It reacts with chlorine to give a brittle white solid. The substance can be pounded into think sheets and drawn into wires. It is a good conductor of electricity. Which of these characteristics are physical properties, and which are chemical properties?

8. Identify the following as physical (P) or chemical (C) properties:
   a) Oxygen is odorless and colorless
   b) Copper turns green when exposed to the environment
   c) A piece of metal is magnetic
   d) The density of water is 1.0 gram per cubic centimeter
   e) Diamonds are a very hard substance
   f) The tree is 8 meters high
   g) Sodium reacts very easily with other elements.
   h) The boiling point of water is 100 degrees C
   i) Oxygen is a gas.

9. Which separation method would you use to separate a solution of sugar and water into pure substances? Which method is used to make a cup of coffee in a drip coffee maker?

Chapters 1.4 Energy

10. Two particles are brought close together and then released. Draw in the diagram how they will move using vectors.

a) 

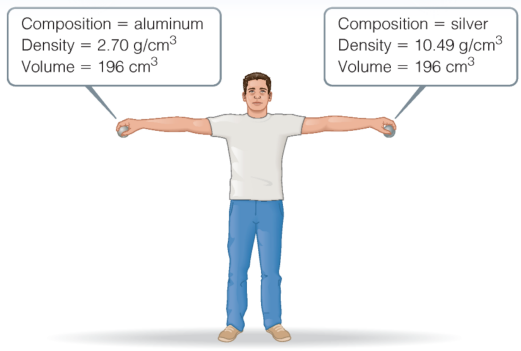
   b) Describe what is happening in terms of potential energy and kinetic energy.
   c) If the beginning distance between the particles increases, how will that change potential energy?

11. Complete question 11 but for the particles below

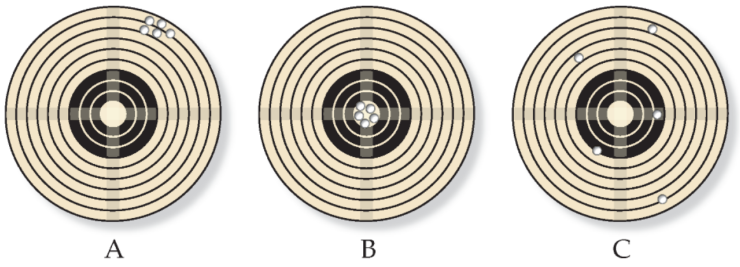
12. If the bond between the chlorine atoms in Cl_2 is broken to form 2 Cl atoms, will energy be consumed or released?

Chapters 1.5 Units of Measurement and Uncertainty

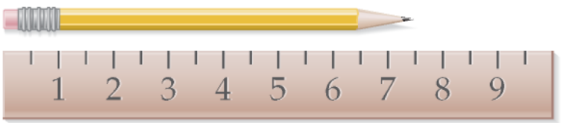
12. Calculate the mass of each sphere in the picture below.



13. Comment on the accuracy and precision of the following results:



14.What is the length of this pencil? How many significant figures are in this measurement?



15. Round each of the following numbers to four significant figures. Write the answer in decimal form AND scientific notation.

a) 300.235800
b) 456,500
c) 0.006543210
d) 0.000957830
e) – 0.0350

16. Carry out the following calculations as if they were calculations of experimental results and express each answer in the correct units with the correct number of significant figures.

a) 5.6792 m + 0.6 m + 4.33 m
b) 3.70 g – 2.9133 g
c) 4.51 cm x 3.6666 cm
d) $[(285.3 \times 10^5) - (1.200 \times 10^3)] \times 2.8954$
e) (0.0045 x 20,000.0) + (2813 x 12)

17. Perform the following conversions. Solve each problem using dimensional analysis, SHOWING YOUR WORK! Every number must have a unit and be expressed with proper significant figures.

a) 50.0 m to mm
b) 25 cm to km
c) 400 mm to m
d) 60 kg to mg
e) 500 nm to km
f) The average speed of helium at 25°C is 1255 m/s. Convert this speed to miles per hour (mph).
g) A baker uses 1.5 tsp of vanilla extract in each cake. How much vanilla extract in liters should the baker order to make 800 cakes? (1 tsp = 5mL)
h) What is the speed of a car in meters per second when it is moving at 100. km/h?
i) There are 7.11×10^{24} molecules in 100.0 cm^3 of a certain substance. What is the number of molecules in 2.24×10^4 cm^3 of the substance?

18. Express the following quantities in scientific notation:

a) 158,000 km
b) 837100000 cm^3
c) 0.000008004 g/L

19. Use the appropriate metric prefixes to express the following measurements without exponents.

a) 2.3×10^{-6} L
b) 4.7×10^{-3} g
c) 1.85×10^{-12} m
d) 16.7×10^{3} g
e) 1.84×10^{-2} m

20. Liquid nitrogen boils at 77 K. Convert this temperature to degrees Fahrenheit and degrees Celsius.

21. Round each of the following numbers to four significant figures

a) 102.52070
b) 656.980
c) 0.008543210
d) 0.000257870

22. You weigh an object on a balance and read the mass in grams according to the picture. How many significant figures are in this measurement? Which digit is estimated?

Chapter 2 Review
Many students find chemical nomenclature to be tough to grasp, therefore you will want to review this material during the summer months.

Chapter 2: Atoms, Molecules, and Ions
Please complete the reading from the textbook, then complete the assigned questions from the **textbook that begin on p. 79**

Topic	Reading	Textbook Questions
2.8 Naming Inorganic Compounds	pp 65-71	
2.9 Simple Organic Compounds	pp 71-73	69, 71, 73a-f, 74ab, 76cdf, 77,80, 81, 83, 84, 86

This flowchart may be helpful as you begin to recognize patterns for naming chemicals.