

Chemistry Chapter 1 – Introduction

1. **Qualitative Properties** – physical properties of elements, such as color, smell, hardness, etc
2. **Quantitative Properties** – measurements of elements, actual figures, such as atomic weight, molarity, etc.
3. **To Infer** – to make an assumption based on observation (Example: The clear liquid in the beaker is water)
4. **Consistent Numbers** – values that remain constant, such as atomic numbers
5. **Artifacts** – values that do not remain constant, such as molarity
6. **Significant Digits** – the number of digits that are relevant in a calculation. Normally, round answers to 3 significant digits
 - a. All non-0 digits are significant
 - b. 0's in the MIDDLE of a number are ALWAYS significant (2048, 0.2008 – 4 significant digits)
 - c. 0's in FRONT of a number are NEVER significant (0.00001 – 1 significant digit)
 - d. When a decimal point is present, 0's at the end are significant (2.000 – 4 significant digits)
 - e. When a decimal point is NOT present, 0's at the end are NOT significant (2500 – 2 significant digits)
 - f. When multiplying/dividing, round to the least number of significant digits of the original numbers ($3.50 * 2.0 = 7.0$)
 - g. When adding/subtracting, the last significant digit is the largest uncertain digit ($1.5+1.2 = 2.7$, $1.9+2.02 = 4.11$)
 - h. Use common sense; give enough significant digits to reasonably give your answer
7. **Common Conversions**
 - a. 1 pound = 1kg
 - b. 1 inch = 2.54cm
 - c. 1 calorie (cal) = 4.184 joules (J)
 - d. 1 kcal = 4184J
 - e. % - parts over 100 (10% is 10/100)
8. **ppm** – parts per million (10ppm is 10/1,000,000)
9. **Temperature** – measure of the average kinetic energy of molecules.
 - a. The coldest temperature possible, or **absolute zero is -273.5C**
10. **Extensive Properties** – properties that are dependent on the amount of the sample, such as mass and volume
11. **Intensive Properties** – properties that are NOT dependent on the amount of sample, such as the boiling point
12. **Exothermic Reaction** – a reaction that releases heat
13. **Endothermic Reaction** – a reaction that absorbs heat
14. **Physical Properties** – properties that can be measured by a sample alone (weight, color, melting point, boiling point, etc)
15. **Chemical Properties** – properties that can be measured when the sample reacts (reaction in acid, how it burns in O_2)
16. **Homogeneous Solution** – a uniformly distributed compound in a solution (salt completely dissolves in water)
17. **Heterogeneous Solution** – a non-uniformly distributed compound in a solution (Oil doesn't mix with water)
 - a. **Mixtures** – substances that are NOT chemically combined
 - b. **Filtration** – filtrate is what passes through the filter (think filtering water)
 - c. **Distillation** – heat a substance to separate it (heat salt water to evaporate the water, leaving pure salt)
 - d. **Paper Chromatography** – Uses differences in solubility VS the adhesion to the substrate to separate mixtures
18. **Law of Composition** – any sample can be broken into the basic elements on the periodic table
19. **Law of Multiple Proportions** – the ratio of one element to another are always in simple whole number ratios