Concept Overview – Checklist

4 Topics

1) Investigate materials, and describe them in terms of their physical and chemical properties:

• Describe properties of materials (e.g., melting point, solubility and conductivity)

• Describe and apply different ways of classifying materials:

* distinguishing between pure substances, solutions and mechanical mixtures
* distinguishing between metals and nonmetals
* identifying and applying other methods of classification

• Identify if a new substance has been produced

2) Describe and interpret patterns in chemical reactions

• Describe evidence of chemical change in reactions between familiar materials, by:

* describing combustion, corrosion and other reactions involving oxygen

• Describe patterns of chemical change, by:

* observing heat generated or absorbed in chemical reactions, and identifying examples of exothermic and endothermic reactions
* identifying conditions that affect rates of reactions (e.g., investigate and describe how factors such as heat, concentration, surface area and electrical energy can affect a chemical reaction)
* identifying evidence for conservation of mass in chemical reactions, and demonstrating and describing techniques by which that evidence is gathered.

3) Describe ideas used in interpreting the chemical nature of matter, both in the past and present, and identify example evidence that has contributed to the development of these ideas:

• Demonstrate understanding of the origins of the periodic table, and relate patterns in the physical and chemical properties of elements to their positions in the periodic table

—Organization of periodic table, families of elements

• Distinguish between observation and theory, and provide examples of how models and theoretical ideas are used in explaining observations

 - Dalton, Thomson, Rutherford, Bohr

• Use the periodic table to identify the number of protons, electrons and other information about each atom; and describe, in general terms, the relationship between the structure of atoms in each group and the properties of elements in that group

• Distinguish between ionic and molecular compounds, and describe the properties of some common examples of each

4) Apply simplified chemical nomenclature (naming) in describing elements, compounds and chemical reactions

• Read and interpret chemical formulas for compounds of two elements, and give the IUPAC (International Union of Pure and Applied Chemistry) name and common name of these compounds

• Identify/describe chemicals commonly found in the home, and write the chemical symbols (e.g., table salt [NaCl(s)], water [H2O(l)], sodium hydroxide [NaOH(aq)] used in household cleaning supplies)

• Identify examples of combining ratios/number of atoms per molecule found in some common materials

• Use information on ion charges to predict combining ratios in ionic compounds of two elements

• Draw simple models of molecular and ionic compounds

• Describe familiar chemical reactions, and represent these reactions by using word equations and chemical formulas [Note 1: Students are NOT required to explain the formation of polyatomic ions. Some chemicals with polyatomic ions may nevertheless be introduced] [Note 2: At this grade level, students are not required to balance reactants and products in chemical equations.]