Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Science	Course:	Chemistry I	Unit 7 Title:	Chemical Reactions	Grade Level(s):	10th
Assessed Trimester:	Trimester B	Pacing:	10 - 15 Days	Date Created:	6/7/2012	Last Revision Date:	6/24/2014

Course Understandings: *Students will understand that:*

- Problems can be solved and knowledge gained in a systematic way: solutions to one problem can create new questions and problems.
- Chemistry is recognized as significant in its application to other disciplines and the world.
- Ideas are expressed symbolically, numerically, and graphically.
- Behavior and properties of materials are organized, classified, and predicted utilizing periodic trends.
- Mathematical relationships are interpreted and manipulated to model the real world.
- The basic building blocks combine and recombine in a variety of ways to make all matter from the simple to the complex.
- The laws of chemistry predict outcomes that impact and apply to daily life.

DESIRED RESULTS (Stage 1) - WHAT WE WANT STUDENT TO KNOW AND BE ABLE TO DO?

Established Goals

- **Standard:**
  9.2.1.2.2: Explain how the rearrangement of atoms in a chemical reaction illustrates the law of conservation of mass. (May also be taught in the Stoichiometry Unit)
  9C.2.1.3.1: Classify chemical reactions as double replacement, single replacement, synthesis, decomposition or combustion.
  9.2.1.2.3: Describe a chemical reaction using words and symbol equations. For example: The reaction of hydrogen gas with oxygen gas can be written: $2H_2 + O_2$ à $2H_2O$
  9C.2.1.3.2: Use solubility and activity of ions to determine whether a double replacement or single replacement reaction will occur.
  9C.2.1.3.3: Relate the properties of acids and bases to the ions they contain and predict the products of an acid-base reaction (medium).
  9C.2.1.3.3: Relate the properties of acids and bases to the ions they contain (low) and predict the products of an acid-base reaction.

- **Standard:** Matter
  Chemical and physical properties of matter result from the ability of atoms to form bonds.
  Benchmark:
  ACT-S-3: Interpolate between data points in a table or graph
  ACT-S-9: Predict the results of an additional trial or measurement in an experiment
  ACT-S-10: Determine the experimental conditions that would produce specified results

- **Standard:** Matter
  Chemical reactions describe a chemical change in which one or more reactants are transformed into one or more products.
  Benchmark: Literacy Standards:
  9.13.3.3: Follow precisely a complex multistep procedure when carrying out experiments, designing solutions, taking measurements, or performing technical tasks, attending to special cases (constraints) or exceptions defined in the text.

Transfer

Students will be able to independently use their learning to: (product, high order reasoning)

- Better control and prepare for chemical reactions in life. (Rust prevention, fire prevention, etc)

Meaning

Unit Understanding(s):	Essential Question(s):
Students will understand that: ● Chemical reactions show the rearrangement of atoms forming new substances.	**Students will keep considering:** ● What happens when chemicals dissolve? ● How are new substances formed in a chemical reaction?

Acquisition

Knowledge - Students will:

- Know the symbols used in chemical reactions (H) 9.2.1.2.3
- Know that the driving forces in a chemical reaction are the formation of a solid, formation of a gas, formation of water and the transfer of electrons (L) 9.2.1.2.3
- Know that a complete ionic equation contains all components in a double displacement reaction. (M)* 9C2.1.3.1
- Know that a net ionic equation describes the chemical change in a double displacement reaction. (M)* 9C2.1.3.1
- Know that acids and bases dissociate into aqueous solutions when put in water. (M) 9C2.1.3.3
- Recognize that acids react with bases in a double replacement reaction. (M) 9C2.1.3.3
- Recognize that the formation of water is the driving force in an acid-base reaction. (L) 9C2.1.3.3

Reasoning - Students will:

- Use a solubility table to predict whether a substance is soluble in water. (M) 9C2.1.3.2
- Classify chemical reactions as double replacement, single replacement, synthesis, decomposition or combustion (H) 9C2.1.3.1
- Interpret the activity series as a list of the relative reactivity of ions. (M) 9C2.1.3.2
- Predict the products of an acid-base reaction. (M) 9C 2.1.3.3
- Relate the properties of an acid to the presence of the hydrogen ion in the aqueous solution of the compound. (L) 9C2.1.3.3
- Relate the properties of a base to the presence of the hydroxide ion in aqueous solution of the compound. (L) 9C2.1.3.3

Skills - Students will:

- Predict products in precipitate, neutralization, single replacement, synthesis, decomposition and combustion reactions. 9C2.1.3.1 (M)
- Use a solubility table to determine whether a double replacement reaction will occur. 9C2.1.3.2 (M)
- Use a complete ionic equation and a net ionic equation to describe a double displacement reaction. 9C.2.1.3.1 (M)
- Use the activity of ions to determine whether a single replacement reaction will occur 9C2.1.3.2 (M)

Common Misunderstandings

- Some students will believe amount of solution is proportional to the molar concentration.
- When a colorless solute dissolves in water, it is easy for students to think that it "disappeared" without understanding the nature of dissolution.
- Students don't always realize that dissolving is a physical process and not a chemical reaction.
- Dilute and Concentrated are often confused with Weak and Strong
- Students confuse the forces within molecules (intermolecular) and forces between molecules (intramolecular)
- Lack of understanding that atoms are rearranged during a chemical change, and not destroyed or created.
- Reactants remain in original form during a chemical reaction.
- Lack of understanding that the properties of products are not related to the properties of reactants.
- Misuse of subscripts and coefficients in balancing equations

Essential new vocabulary

- Chemical equation
- Product
- Reactant
- Yield
- Precipitate
- Aqueous
- Activity series
- Spectator ion
- Acid
- Base
- Neutralize,
- Ion
- Hydroxide ion
- Hydrogen Bond
- Hydrogen Ion [Hydronium (LOW)]