Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Science	Course:	Chemistry I	Unit 4 Title:	Solubility and Organic Chemistry	Grade Level(s):	10th
Assessed Trimester:	Trimester A	Pacing:	5 - 10 Days	Date Created:	6/24/2014	Last Revision Date:	6/25/2014

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:**
  9C.2.1.2.2: Compare and contrast the structure, properties and uses of organic compounds, such as hydrocarbons, alcohols, sugars, fats and proteins.
  9C.2.1.2.6: Describe the dynamic process by which solutes dissolve in solvents and *calculate concentrations, including percent concentration, molarity and parts per million. [*note: the second half of this benchmark will follow the mole unit in Tri B]
  9C.2.1.2.7: Explain the role of solubility of solids, liquids and gases in natural and designed systems. For example: The presence of heavy metals in water and the atmosphere.

Transfer

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

- Read and interpret graphs to make determinations.
- Apply understandings of organic molecules to their roles in biological systems.
- Understand how and why certain chemicals are used to clean certain materials.

Meaning

Unit Understanding(s):	Essential Question(s):
Students will understand that: ● The ability of chemists to synthetically produce organic compounds has spawned a modern consumer products industry with its associated environmental and societal challenges. ● Solutions are dynamic, composed of differing phases, and can be affected by outside influences such as temperature, pressure, and properties of the chemicals themselves.	**Students will keep considering:** ● How organic molecules work in biological systems. ● How chemicals dissolve and how temperature can affect solutions in natural and designed systems.

Acquisition

Knowledge - Students will:

- Recognize the functional groups found in alcohols, fats and proteins. (-OH, -NH_2, =COOH, 9C.2.1.2.2 (M)
- Given a structural formula, classify the compound as a hydrocarbon, alcohol, sugar, fat and protein. (M) 9C.2.1.2.2
- Recognize sugars as a carbohydrate. (L) 9C.2.1.2.2

Reasoning - Students will:

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Skills - Students will:

- Explain the relationship between temperature and solubility and use a solubility graph to determine the level of solubility of a solute in a solvent at a given temperature (M) 9C.2.1.2.7
- Use a solubility curve to determine the grams solute that will dissolve in 100g solvent (water) at a given temperature. (M)
- Use a solubility table to determine if an ionic compound is soluble or insoluble in water. (M)
- Create a solubility curve from lab data and use it to predict the solubility and solution type at differing temperatures.(L)

Common Misunderstandings

- Students get confused when talking about the forces within molecules versus forces between molecules
- Many students think solvents must be liquids.
- 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 fail to recognize the three dimensional nature of carbon compounds. For example, in naming a branched alkane they don't realize that the carbon atoms in the straight chain may be counted from either end of the molecule. Students think that a "branch" is on a different numbered carbon but the molecule can be "flipped over" and counted from the other end. This is why the carbon atoms are counted from either end that gives the branch the shortest number.

Essential new vocabulary

- Fats
- Proteins
- Organic
- Inorganic
- Hydrocarbon
- Alcohol
- monomer
- polymer
- solute
- solvent
- solubility
- soluble
- insoluble
- Sugar