Unit 4 Learning Outcomes
Chem 1010

4A: Fire
You should be able to:

- Explain what is happening when a candle burns.
- List some ways in which fire was used before modern technology, and how we use it today.
- Explain what happens when organic materials burn, including what products are formed with sufficient heat and oxygen, and without.
- Give some examples of other elements that will burn, and what kind of compounds will be produced.
- Explain where the energy of fire comes from.
- List the three things that are needed for a combustion reaction to continue, and give examples of how fires can be put out by removing these things.
- List the types of fires, and explain why putting water on a fire can sometimes be dangerous.
- List 3 types of materials which are not flammable, and explain why they don't burn.

4B: Explosions
You should be able to:

- Describe the characteristics of an explosion, and what makes it different from combustion.
- Give some uses of explosions.
- List the three types of explosions, and give an example of each.
- List the characteristics necessary for a chemical reaction to be explosive, and give some examples of chemicals which can undergo explosive reactions.
- Explain how nuclear explosions are different from chemical explosions.

4C: How Sweet It Is (I)
You should be able to:

- Give the purpose of each of the ingredients in the Pepsi products discussed in class, and classify them as compounds or mixtures.
- Explain what table sugar is, its two most common sources, and what it looks like chemically.
- Draw pictures to describe the process by which sucrose is digested and used by the cells in your body.
- Describe the three parts of a corn seed and what they contain.
- Describe the process by which cornstarch is processed to become HFCS.
- Give the relative sweetness of the common monosaccharides and disaccharides, and explain what implications this has for HFCS.
- Match the characteristics and sources of non-nutritive sweeteners with their chemical names.
- Give examples of sweet compounds which are not safe to consume.

4D: How Sweet It Is (II)
You should be able to:

- Explain how each of the following is related to table sugar: powdered sugar, molasses, brown sugar, natural brown sugar, and rum. How is each one used?
- Explain how honey, maple syrup, and agave nectar differ from table sugar.
- Match the sources for different sweeteners with their source.

4E: Fats and Oils
You should be able to:

- Explain what purposes food serves in your body.
- List the 4 types of macronutrients and 2 types of micronutrients, as well as what else is in food.
- Explain the main purpose of fats and oils, and how this compares to carbohydrates.
- List other uses of fat in our diet.
- List some diseases or conditions that obesity is linked with higher risk of.
- Recognize the line structure of fats and fatty acids, and be able to distinguish the two.
- Explain the difference between the structure of saturated and unsaturated fats, what sources they come from (including exceptions), and what they are like physically.
- Recognize the structures of omega-6 and omega-3 fatty acids, and what sources they come from.
- Explain the process of hydrogenation, how it is useful to the food industry, and what negative results can come from it.
- Explain how to recognize healthy and unhealthy fats.

4F: Proteins and Water
You should be able to:

- Explain the two things that proteins are used for besides energy.
- Explain how to calculate how much protein an average person would need, and what kinds of people would need extra protein.
- List a variety of sources of protein.
- Explain the structure of amino acids, how they are combined to make protein, and how many are commonly found in protein.
- Explain the connection between DNA and protein.
- Explain the process by which proteins you eat become the proteins you need.
- Explain the difference between complete proteins, incomplete proteins, and complementary proteins.
- Explain why water is an important nutrient, including some of the functions it performs in your body.
- Give some symptoms of dehydration, and some situations where it can easily occur.
- Explain how to calculate how much water you need each day.
- Explain why drinks containing caffeine can be less effective at treating dehydration.
- Analyze the macronutrients in a variety of foods.

4G: Vitamins and Minerals
You should be able to:

- Explain how vitamins and minerals are different from the macronutrients.
- Explain the difference between fat-soluble and water-soluble vitamins, and be able to look at the structure of a vitamin and determine which is it.
- Give some basic facts about vitamins A, C, and D, including what they are important for, what happens if you don't have them, and what foods contain them.
- Explain the difference between vitamins and minerals, including where they come from.
- List some major minerals and some minor minerals, and what they are used for in the body.
- Explain why Nutrition Facts labels are useful, and what kinds of information they contain.