

Chemistry Lab

Teacher: Mrs. Edie Dukek

This chemistry laboratory supplements a complete chemistry course you will be taking at home. We could perform the explorations in many different orders. However, we will be performing labs in the order of subjects studied in Berean Builder's *Discovering Design With Chemistry* by Jay Wile © 2015. You do not need to purchase this Jay Wile text. Just use this syllabus to guide your study in the Apologia text or other text that you have. Notes have been inserted to help you find the corresponding order of modules in the first, second and third editions of Apologia's chemistry texts. Some of the labs we do may be the same as those in these texts, but many will not. The descriptions are subject to revision. **The dates listed are the dates we will have class**, unless Marion Independent declares that school will not be held, such as a snow day. If at any time you wish more explanation about a topic or you have a question about the class, feel free to email me at edukek@marion-isd.org or call at 270-0693. I also encourage you to perform experiments at home from your text. The more chemistry you do, the more you will learn!

September 7: Chapter 1a, Measuring Up I (Mod 1a in first 3 editions)

Students will identify and learn uses of lab equipment. They will also use the English and metric systems to perform measurements involving length, mass and volume, and they'll start learning the factor-label method (units analysis) to solve problems.

September 14: Chapter 1b, Measuring Up II (Mod 1b in first 3 editions)

We will continue practicing the factor-label method for solving problems and will learn how to calculate the density of a variety of materials.

September 21: Chapter 2a, What's the Matter? I (Mod 3a in 1st/2nd eds; Mod 2a in 3rd)

Students will see demonstrations of homogeneous and heterogeneous mixtures, solutions, colloids and suspensions. Students will cause zinc to mix with the copper on a penny. They will take home a new penny, a zinc-plated penny and a brass-plated penny.

September 28: Chapter 2b, What's the Matter? II (Mod 3b in 1st/2nd eds; Mod 2b in 3rd edition)

Students will perform labs dealing with mass conservation, elements vs compounds and Dalton's Atomic Theory.

October 5: Chap 3, Making Sense of Atoms & Elements (Mod 7 in 1st/2nd eds; Mod 3 in 3rd)

The Periodic Table is a picture of the results of atomic structure. Atoms bond, or don't bond, with each other as a result of their atomic structures. We'll learn about the parts of the atom, diagram the Periodic Table and look at diffraction grating spectra.

October 12: Chap 4a, Mod. View of Atoms & Their Chemistry I (Mod 8a in 1st/2nd; Mod 4a in 3rd)

We'll discuss element electron configuration including subshells, and we'll examine Lewis dot structures.

October 19: Mole Day!

October 23 (10/23), from 6:02 in the morning to 6:02 at night, is Mole Day! We will be celebrating Mole Day with a variety of fun games and challenges!

Oct 26: Chap 4b, Modern View of Atoms & Their Chemistry II (Mod 8b in 1st/2nd; Mod 4b in 3rd)

Examples of different kinds of elements will be on display. Ionic bonding (metals plus non-metals) will be discussed, and we'll perform a lab about electrolytes.

November 2: Organic Chemistry (bonus topic!)

Models of hydrocarbons will be built and named.

Nov 9: Chap 5, Covalent Compounds & Molecular Geometry (Mod 8-9 in 1st/2nd; Mod 4-5 in 3rd)

After atoms form molecules, their shapes determine their characteristics. These shapes can also be extrapolated into solid polyhedra which we will build, using molecular model kits. A lab will be performed which demonstrates the adage "like dissolves like".

November 16: Chapter 6a, Physical & Chemical Change I (Mod 4 in 1st/2nd eds; Mod 6 in 3rd ed)

We will discuss chemical and physical changes; and phase changes. Students will perform the lab "Using up a Metal" and will graph the cooling curves for water and lauric acid.

No class November 23. Enjoy Thanksgiving with your family!

November 30: Chap 6b, Physical & Chemical Change II (Mod 5 in 1st/2nd ed; Mod 7 in 3rd edition)

We will see examples of the four types of reactions: composition, decomposition, single displacement and double displacement. We will perform a lab on combustion of a hydrocarbon.

No classes December 1–January 2 Enjoy an outstanding Christmas Break with your family!!!

January 4: Chapter 7, Stoichiometry (Module 6a in 1st/2nd editions; Module 8a in 3rd edition)

Students will enjoy the lab "Lego Equations", about balancing equations. They will learn the art of balancing chemical reactions based on the idea of mass conservation. Rules will be given and techniques acquired for figuring out the amount of reactant produced from a certain amount of product. The idea of "limiting reactants" will be introduced.

January 11: Chapter 8, Still More on Stoichiometry (Mod 6b in 1st/2nd eds; Mod 8b in 3rd)

Students will gain more experience with polyatomic ions, percentage yield and stoichiometry.

January 18: Chapter 9, Chemists Have Solutions (Mod 11 in 1st/2nd eds; Mod 10 in 3rd ed)

Teacher will perform two demos: Freezing Point Depression and Boiling Point Elevation. Students will perform three labs from the text, about solubility.

January 25: Chapter 10, It's a Gas! (Module 12 in 1st/2nd editions; Mod 11 in 3rd edition)

Teacher will demonstrate Charles' and Boyle's Gas Laws. Students will perform a lab which uses the ideal gas equation to determine the amount of acid in vinegar.

February 1: Chap 11, Some Basic (& Acidic) Chemicals (Mod 10 in 1st/2nd eds; Mod 9 in 3rd)

After examining the pH scale, we will perform a lab determining the pH of common household substances. Then we will use a burette and an indicator to titrate an acid, determining its acidity.

February 8: Chapter 12a, Reduction & Oxidation Reactions I (Module 16a in 1st/2nd/3rd eds)

We'll use the saying "LEO goes GER" to identify oxidation and reduction. Industry uses redox reactions heavily to separate valuable metals from their ores. We will examine this process.

February 15: Chapter 12b, Reduction & Oxidation Reactions II (Module 16b in 1st/2nd/3rd eds)

We will experiment with the variables which make voltaic cells function.

February 22: Chapter 13a, The Heat is On I (Module 2 in 1st/2nd eds; Module 12 in 3rd ed)

Students will learn about the calorie, a unit chemists use to measure heat capacity. After calibrating thermometers, they will use the experimental process of calorimetry to measure the heat capacity of a metal.

March 1: Chapter 13b, The Heat is On II (Module 13a in 1st, 2nd & 3rd editions)

Students will perform an experiment whereby data is collected and graphed to visualize results of both exothermic and endothermic reactions. They will also find the amount of heat that is absorbed when one mole of ice melts.

March 8: Chapter 14, Thermodynamics (Module 13b in 1st, 2nd & 3rd editions)

Students will do the experiment “Determining the ΔH for a Physical Change”.

No classes March 12-16 because of Spring Break!

No classes March 19-23 because of Iowa Assessments.

No class March 29-Enjoy Easter Week with your family!

April 5: Chapter 15, Kinetics (Module 14 in 1st, 2nd & 3rd editions)

This session focuses on the factors that affect chemical reaction rates.

April 12: Cotton Dyeing (bonus topic!)

Students will each make their own tie-dyed T-shirt in class and wear it to class next week!

April 19: Chapter 16a, Chemical Equilibrium I (Module 15a in 1st, 2nd & 3rd editions)

Please wear your tie-dyed shirts for class pictures! Also, we'll perform a lab answering how equilibrium is shifted back and forth in a reaction.

April 26: Chapter 16b, Chemical Equilibrium II (Module 15b in 1st, 2nd & 3rd editions)

We'll determine how changes in concentration and temperature affect the equilibrium of a compound.

May 3: Polymers (bonus topic!)

This class period will be used to make up a class lost due to inclement winter weather, or students will perform selected experiments with polymers like polyacrylamide, polyvinylchloride (PVC) and starch to determine differences in the attributes of the polymers.

May 20, 2017