Chemistry Semester 1	
Units/Topics	**Labs**
Measurement and Matter Ch 1, 2 o Metric system o Matter and Energy	**Wondering Why**: Observe several reactions in a well plate. **Conservation of Mass**: Observe and measure the conservation of mass for two reactions.
Atomic Structure Ch 3, 4 o Historical models o Modern model o Nuclear chemistry	**Flame Test/Atomic Models**: Observe the various spectra of several elements. Build two atomic models. **Elements**: Research on a metal and a nonmetal, compare and contrast the metal vs. non-metal properties. Observe element samples.
The Periodic Table Ch 5, 6 o Memorize 30 common elements o Periodic trends o Element report	**Metallic Reactivity**: Compare the reactivity of the alkali earth metals and the alkali metals. Includes a video. **Magnesium Oxide**: Use mass measurements to determine the formula of magnesium oxide.
Chemical Formulas & Bonding Ch 7, 8 o Ionic vs. Covalent o Naming compounds o Simple molecular shapes o Polarity	**Solubility and Bond Type**: Compare the solubility of several substances in several solvents to determine the relative polarities of all substances. **Seeing Reactions**: Observe several reactions, write the equations, and classify the reaction type.
Reactions and Moles Ch 9, 10 o Writing and interpreting equations o Classification of Reactions o Definition of Moles o Molar mass o Gram/Mole conversions o Particle/Mole conversions	**Single Replacement of a Metal**: Observe several reactions and compare the reactivity of several metals. **Moles**: Observe and measure several mole samples and calculate the number of particles in various objects.
Stoichiometry Ch 11 o Stoichiometry Problem Solving o Limiting Reactants	**Stoichiometry of a Reaction**: React carbonate salts with HCl, calculate the moles of product and compare that calculation to the stoichiometric prediction. **Limiting Reactants**: Use stoichiometry to set up two reactions of Zn with HCl so that each reaction has a different limiting reactant. Observe the results the next day.

Chemistry Semester 2	
Units/Topics	**Labs**
Heat Ch 12 o Heat in reactions o Calorimetry o Specific Heat	**Heat In Reactions**: Use calorimetry to measure the heat of three reactions. **Hess's Law**: Apply Hess's Law to predict the heat of a reaction.
Gases Ch 13 o States of matter o The Gas Laws o Kinetic Molecular Theory	**Gas Laws**: Test and confirm the gas laws. **Project:** Deadline for project topic and recipe in late February
Solutions and Equilibrium Ch 15, 16, 17 o Dissociation and Ionization rxns o Concentration/Molarity o Solubility and Precipitation o Equilibrium expressions, K_{eq} o Factors affecting the equilibrium balance	**Solubility**: Compare and contrast the solubility of two salts. **Identification of Ions**: Use insolubility and precipitation to determine which ions are present in various solutions. **Equilibrium**: Create an equilibrium system, disturb the system and observe the results. Use the results to predict the effect of other disturbances. **Project**: Students work on chemistry projects.
Acid/ Base Solutions Ch 18,19 o Neutralization o Titration o Buffers **Chemistry Project progress report due mid-April**	**Titration of a Strong Acid**: Determine the concentration of a HCl solution and graph pH vs. volume of base for the titration. **Titration of a Weak Acid**: Determine the concentration of an HCl solution and graph pH vs. volume of base for the titration. **Project**: Students work on their chemistry projects.

Oxidation and Reduction Ch 20, 21 o Oxidation number o Balancing Redox rxns o Electrochemical Cells o Calculating Potential Difference **Chemistry Project due in late May**	**Rust Marches On**: Observe the intermediate steps of rust formation using indicators. Determine the reaction mechanism of rust. **Electrochemical Cells**: Build and measure the voltage produced by three electrochemical cells.
Thermochemistry Ch 22, 23 o Kinetics o Enthalpy o Entropy o Gibbs Free Energy	**Reaction Rates:** Time reactions between sodium thiosulfate and hydrochloric acid while varying the concentrations of each reactant to determine the effect of concentration on reaction rate.