

Charleston Catholic High School

Subject: Chemistry 1

Total Time: Two Weeks

Essential Question: What is energy? How can energy be classified? What is the difference between temperature and heat? What are exothermic and endothermic processes? How can we experimentally measure changes in energy? What is enthalpy? What is specific heat capacity? How can Hess's law be used to predict and calculate enthalpy changes in a series of reactions?

Standards	Lesson Title	Skills and Activities	Assessments	Resources	Time
SC.O.PS.2.4 SC.O.PII.2.3	The Nature of Energy	Students will define energy as the ability to do work or produce heat. Energy will be classified as potential or kinetic. Students will learn the formula for kinetic energy. The law of conservation of energy and state functions will be defined.	homework	textbook	1 day
SC.O.C.2.13 SC.O.CC.2.19	Exothermic and Endothermic Processes; Thermodynamics	The system and surroundings will be defined for a process. Reactions and processes that result in the evolution of heat or the absorption of energy from the surroundings as exothermic or endothermic. The first law of thermodynamics and the internal energy of a system will be defined.	various demos, homework	textbook, lab materials	2 days

SC.O.CC.2.19 SC.O.CII.2.12 SC.O.CC.2.13 SC.O.CC.2.9 SC.O.CII.1.5	Measuring Energy Changes	<p>Define calories, Calories, and joules as units of energy. Define specific heat capacity and perform calculations involving specific heat capacity. Introduce the concept of a calorimeter as a device to determine the heat associated with a chemical reaction. Students will perform a series of three labs involving calorimetry. In the first experiment students will build a coffee cup calorimeter and determine the calorimetry constant of their coffee cup calorimeter. Students will perform three trials of measuring temperature changes involving the mixture of hot and cold water. This data will then be used to calculate the calorimeter constant of their calorimeter. In the second experiment students will be given unidentified metal pellets. The students will heat the metal pellets to one hundred degree Celsius and mix them with cold water in their calorimeter. The students will calculate the specific heat of their metal pellets using the measured mass of the water and pellets, their previous calculated calorimeter constant, and the temperature changes. Students will then identify the metal pellets by comparing their experimental data to a list of specific heat capacities of metals. In the third experiment, students will measure the heat flow from the</p>	lab, homework, prelab and post lab quizzes.	textbook, lab materials	5 days

		reaction of equal mole amounts of strong acids and bases (neutralization reactions) and classify this process as exothermic or endothermic.			
SC.O.CII.2.11	Thermochemistry	Define enthalpy under conditions of constant pressure. Perform calculations from a chemical equation to predict how much heat would be absorbed or released as a result of a chemical reaction. Calculate enthalpy change for reactions using Hess's law. Predict whether a reaction will be exothermic or endothermic using Hess's law.	homework, worksheet, Test	textbook	3 days

Formative Assessments: Lab reports, prelab quizzes, and worksheets.

Summative Assessments: Test

Essential Unit Vocabulary: Energy, potential energy, kinetic energy, law of conservation of energy, work , state functions, heat , temperature, system, surroundings, exothermic, endothermic, thermodynamics, first law of thermodynamics, second law of thermodynamics, internal energy, calories, Calories, joules, entropy , enthalpy , calorimeter, specific heat capacity, calorimeter, Hess's Law, driving force, energy spread, and matter spread

Instructional Resources: Introductory Chemistry, 8th Edition Steven S. Zumdahl, Donald J. DeCoste

