Haddon Township High School
Course Overview – Lab Chemistry

Subject Area: Science
Course Name: Lab Chemistry

Summary: This course approaches the study of chemistry from a theoretical and analytical standpoint. Topics include an examination of matter at the atomic level and the energy transfer that matter experiences during chemical and physical changes. Measuring and mathematics are applied.

Unit Title	Student Learning Target	Standards	Resources	Assessment
Matter and The Ozone Story	• Apply and practice standard laboratory safety procedures and equipment. • Describe the organization of the elements on the periodic table.	5.1: All students will understand that science is a both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.	textbook, video, lab materials, Nobelprize.org – importance of chemistry	Make a poster or a model to illustrate the depletion of ozone in the stratosphere.
Math in Chemistry	• Determine the number of moles in a sample of four elements Cu, S, Al and Zn. • Relate metrics to English units.	5.1: All students will understand that science is a both a body of knowledge and an evidence-based, model-building enterprise that	balances, rulers, graduated cylinders, element samples – Cu, Al, Zn and S, aluminum foil, calculators	Determine the number of atoms in the thickness of aluminum foil.

	• Complete metric to English conversions. • Use the rules for significant figures when measuring or calculating.	continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.		
Atomic Structure	• Give the number of neutrons, protons and electrons in an element. • Configure the electrons in the energy levels. • Describe the development of the model of the atom and the scientists involved from John Dalton in 1803 to the modern quantum model.	5.2: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science. 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.	samples of matter, video on atomic structure, lab activity packets	Mini-Mendeleev periodic table activity, using trends and patterns to make predictions
Electrons in atoms and	• Write electron	5.2: All students will	Textbook, video, periodic	Play electron configuration

periodic trends	configuration in three ways – electron configuration notation, orbital notation and electron dot notation. • Relate the electron arrangement to the block, period and group of the element on the periodic table location.	understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science. 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.	table	game. Given an element, write its configuration. Given the block, period and group of an element write its electron configuration.
Chemical bonding	• Determine type of bond using electronegativity and type of element. • Write chemical formulas. • Name ionic and covalent compounds.	5.2: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science. 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and	polyatomic ion sheet and periodic table	Play the formula writing/naming compound game, with the class separated into two teams.

		organizational cultures.		
Chemical Reactions and Equations	• balance and categorize chemical equations. • demonstrate the law of conservation of matter by modeling chemical reactions.	5.1: All students will understand that science is a both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science	chemicals, test tubes and beakers, balances, computers with Internet access	Labs: Types of Chemical Reactions Research: Randomly choose an element and research important reactions that the element undergoes. Relate to technology uses.
Measuring Matter - Stoichiometry	• Apply the mole concept to all types of chemical reactions. • Use dimensional analysis to determine theoretical yield and percent yield of a chemical reaction.	5.1: All students will understand that science is a both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.	chemicals, balances, filter paper, funnel, calculator	Lab activity: Given a word equation, students determine a balanced equation. Use the balanced equation to determine mass of precipitate formed from a given amount of reactant. Collect the precipitate and verify the amount. Determine the percent yield.

Kinetic Molecular Theory – Properties of Gases	• Use kinetic molecular theory to explain expansion, diffusion and low density of gases. • Explain how real gases deviate from ideal gas behavior in applying universal gas law. • Solve gas law problems.	5.1: All students will understand that science is a both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science 5.2: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science. 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.	textbook, Safari Montage video, computer with Internet access, calculator, chemicals, balance, graduated cylinder, zipper closing plastic baggie	Research: Explain how an airbag works and what gas fills the airbag. Model the filling of the bag by a chemical reaction. Lab activity: Determine the amount of reactant required to produce CO_2 to fill a baggie.
Mixtures and Solutions	• Describe at least three types of mixtures and how they form. • Explain how temperature	5.2: All students will understand that physical science principles, including fundamental	chemicals, thermometers, balances	Write a report explaining how energy involved in each step of solution process determines heat of

	determines concentration and rate of solutions.	ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.		solution. Connect to temperature changes – exothermic and endothermic values. Diagram the process and label energy changes.
Energy and Chemical Change	• Distinguish between physical and chemical changes and energy involved. (combustion reactions). • Relate specific heat of a substance to heat absorbed or transferred (water – temperate climate of islands).	5.1: All students will understand that science is a both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science 5.2: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.	burners, balances, thermometers, food item, water	Labs: Determine the energy given off from a burning potato chip; warming curve of water and potential/kinetic energy changes.
Acids and bases/chemical equilibrium	• Explain differences between acids and bases. • Name them, based on their chemical formulas, and state their properties. • Describe how they	5.1: All students will understand that science is a both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises	burets, solutions, pH paper, computer with Internet access	Lab activity: titrate an unknown acid. Research: make a timeline of the history of acids and bases.

	chemically react. • Titrate an acid using a base to determine its concentration.	knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science 5.2: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science. 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.		
Redox reactions/Electrochemistry	• Describe the process of electron exchange in chemical reactions. • Write chemical equations to represent redox reactions. • Relate energy changes to endothermic or exothermic chemical reactions. (Energy in or energy out)	5.2: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science. 9.1: All students will	Beakers, solutions, glass u-tube, cotton, diagrams, colored pencils, potential difference chart	Students will design and construct a voltaic cell and measure its voltage. They will correctly label a diagram of the cell and determine the half-reactions at each electrode.

		demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.		
Organic Chemistry Introduction	• Name and draw basic organic compounds. • State properties of the alkanes, alkenes and alkynes.	5.1: All students will understand that science is a both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science 5.2: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science. 5.3: All students will understand that life science principles are powerful conceptual tools for making sense of the	molecular model kits, textbooks	Analyze the gas used in the lab in the Bunsen burner. Using the mole concept and gas laws, students determine the molar mass of the burner gas to determine its identity.

		complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics. 9.1: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.		