



GREAT NECK PUBLIC SCHOOLS

"Where Discovery Leads to Greatness"

#DiscoverGreatness

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Course Profile: Inquiry Chemistry

<u>Department</u>	Science		
<u>Course Name</u>	Inquiry Through Chemistry		
<u>Course Length</u>	1 Year		
<u>High School Credits</u>	1 Unit of Credit		
<u>Description</u>	This course will provide students with an overview of general chemistry and scientific inquiry. Students will gain an understanding of atomic concepts, the periodic table, chemical bonding, the physical and chemical properties of matter, acids, bases and more. This course will involve many hands-on lab activities, experiments, and virtual activities that will further knowledge, understanding of chemistry, and problem-solving techniques. In addition, this course will emphasize a discovery approach in which the student will learn to interpret laboratory observations in the manner of a real world scientist. Students will understand and apply scientific concepts, principles, and theories pertaining to chemistry and recognize the historical development of ideas in science and their real-world connections.		
<u>Target/eligible students</u>	High School Students		
<u>State Learning Standards Link(s)</u>	NYS Science Learning Standards HS. Structure and Properties of Matter HS. Chemical Reactions HS. Energy HS. Waves and Electromagnetic Radiation		pg 54 pg 56 pg 60 pg 62
<u>Primary texts and materials</u>	CK12 Flex Book ; Explore Learning		
<u>Scope/Sequence</u>	Standards	Key Ideas, Terms, Concepts	
Unit 1: Matter and Energy	HS-PS1-1 HS-PS1-3 HS-PS1-4 HS-PS1-7 HS-PS3-1 PS-PS4-4	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: - PS1.A Structure and Properties of Matter - PS1.B Chemical Reactions - PS3.A Definitions of Energy - PS3.B Conservation of Energy and Energy Transfer Students will learn about the different forms of matter and how matter is qualitatively and quantitatively described. <i>*unit will not cover stoichiometry with Avogadro's number</i>	pg 54 pg 56 pg 60 pg 60
Unit 2: Atomic Structure and Nuclear Chemistry	HS-PS1-1 HS-PS1-3 HS-PS1-4 HS-PS1-7 HS-PS1-8 HS-PS4-4	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: - PS1.A Structure and Properties of Matter - PS1.B Chemical Reactions - PS1.C Nuclear Processes - PS2.B Types of Interactions - PS3.A Definitions of Energy - PS3.B Conservation of Energy and Energy Transfer - PS4.A Wave Properties	pg 54 pg 56 pg 54

		- PS4.B Electromagnetic Radiation - PS4.C Information Technologies and Instrumentation Students gain experience in the history of the atomic model and discovery of subatomic particles. Students will distinguish between atomic mass, mass number, and valence electrons.	pg 54 pg 60 pg 60 pg 62 pg 62 pg 63
Unit 3: Formulas and Equations	HS-PS1-1 HS-PS1-2 HS-PS1-7	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: - PS1.A Structure and Properties of Matter - PS1.B Chemical Reactions Students will classify changes in matter as physical or chemical, identify reactants and products in a chemical equation, and use appropriate symbols to write an equation or chemical formula.	pg 54 pg 56
Unit 4: Moles and Stoichiometry	HS-PS1-4 HS-PS1-7	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: - PS1.A Structure and Properties of Matter - PS1.B Chemical Reactions - PS3.B Conservation of Energy and Energy Transfer Students will differentiate between qualitative and quantitative measurements of matter. Students will relate significant figures in a measurement to accurately measure the amount of a substance. Practice will take place using balances, rulers, thermometers, and graduated cylinders. Stoichiometry calculations will involve balancing equations, identifying the limiting reactants, and predicting yields. <i>*unit will not cover stoichiometry with Avogadro's number or multi-step conversions</i>	pg 54 pg 56 pg 60
Unit 5: Gases	HS-PS1-3 HS-PS-1-9	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: - PS1.A Structure and Properties of Matter - PS1.B Chemical Reactions - PS2.B Types of Interactions - PS3.B Conservation of Energy and Energy Transfer Students will identify the states of matter, explain the kinetic theory of gases, and distinguish between real and ideal gases. Partial pressures will be explored along with other gas laws. <i>*unit will not cover stoichiometry with Avogadro's number, Combined Gas Law, Ideal Gas Law</i>	pg 54 pg 56 pg 54 pg 60
Unit 6: Periodic Table of Elements	HS-PS1-1 HS-PS1-2 HS-PS1-3	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: - PS1.A Structure and Properties of Matter - PS1.B Chemical Reactions	pg 54 pg 56

		PS2.B Types of Interactions Students will recognize the symbols/names of common elements and use the periodic table to evaluate relationships between different elements and predict the placement of unknown elements.	pg 54
Unit 7: Bonding	HS-PS1-1 HS-PS1-2 HS-PS1-3 HS-PS1-4 HS-PS2-6	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: - PS1.A Structure and Properties of Matter - PS1.B Chemical Reactions - PS2.B Types of Interactions - PS3.B Conservation of Energy and Energy Transfer Students will relate the periodic table and properties of the elements to the types of bonds. Both Ionic and Covalent bonds will be explored along with the naming of compounds.	pg 54 pg 56 pg 54 pg 60
Unit 8: Solutions	HS-PS1-2 HS-PS1-3 HS-PS-1-10	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: - PS1.A Structure and Properties of Matter - PS1.B Chemical Reactions - PS2.B Types of Interactions Students will explore solubility curves and predict the saturation level of a solution. Molarity will be discussed and how it is calculated.	pg 54 pg 56 pg 54
Unit 9: Kinetics and Equilibrium	HS-PS1-2 HS-PS1-4 HS-PS1-5 HS-PS1-7 HS-PS-1-9	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: - PS1.A Structure and Properties of Matter - PS1.B Chemical Reactions Students will interpret graphic representations of activation energy and reaction rates. Students will observe how reactions reach equilibrium and how that is communicated graphically.	pg 56 pg 56
Unit 10: Acids, Bases, and Salts	HS-PS1-2 HS-PS1-6 HS-PS1-7 HS-PS-1-10 HS-PS1-11	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: - PS1.A Structure and Properties of Matter - PS1.B Chemical Reactions Students will explore the pH scale, strength of acids, bases, and neutralizations. <i>*unit will not cover titration calculations, or titrations with polyprotic acids and bases.</i>	pg 54 pg 56
Unit 11: Redox and Electrochemistry	HS-PS1-2 HS-PS1-7 HS-PS1-12	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas:	

		• PS1.A Structure and Properties of Matter • PS1.B Chemical Reactions Students will relate ionization and partial charges of elements according to there position on the periodic table. Students will use oxidation and reduction numbers to predict chemical formulas and compounds. <i>*unit will not include voltage calculations</i>	pg 56 pg 56
Unit 12: Organic Chemistry	HS-PS1-2 HS-PS1-3 HS-PS1-7 HS-PS2-6	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: • PS1.A Structure and Properties of Matter • PS1.B Chemical Reactions Students wil learn the prefixes and uses of organics. Comparisons will be made to inorganic compositions and connections will be made to other areas of science.	pg 56 pg 56 pg 54