



GREAT NECK PUBLIC SCHOOLS

"Where Discovery Leads to Greatness"

#DiscoverGreatness

Phipps Administration Building
Office of Instruction
345 Lakeville Road
Great Neck, New York 11020

516.441.4009
516.441.4010
Fax 516.441.4992

Course Profile: Chemistry Regents

<u>Department</u>	Science		
<u>Course Name</u>	Regents Chemistry		
<u>Course Length</u>	1 Year		
<u>High School Credits</u>	1 Unit of Credit		
<u>Description</u>	A standard high school chemistry course, which emphasizes the relationship of matter and energy and how it relates to our world and everyday lives. Laboratory work in small groups uses a "hands on" approach and serves to illustrate and reinforce basic concepts and relationships. The Chemistry Regents examination will be the final exam for this course, requiring 1200 lab hours. Class daily plus lab alternate days.		
<u>Target/eligible students</u>	10th and 11th Grade High School Students		
<u>State Learning Standards Link(s)</u>	http://www.nysed.gov/common/nysed/files/programs/curriculum-instruction/p-12-science-learning-standards.pdf 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>	- Holt Chemistry The Physical Setting, Myers, Oldham, Tocci or Pearson: Basic Chemistry - Timberlake - CK-12 Online Textbook https://flexbooks.ck12.org/cbook/ck-12-chemistry-flexbook-2.0/r117/ - gizmos.explorelarning.com -Various online resources		
<u>Scope/Sequence</u>	Standards	Key Ideas, Terms, Concepts	
<u>Unit 1: Matter and Energy</u>	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 The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (HS-PS1-3),(secondary to HS-PS2-6) - pg.. 54 PS1.B Chemical Reactions The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2),(HS-PS1- 7) - pg.. 56 PS3.A Definitions of Energy Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is	pg. 54 pg. 56 pg. 60 pg. 61

		continually transferred from one object to another and between its various possible forms. (HS-PS3-1),(HS-PS3-2) - pg.. 60 PS3.B Conservation of Energy and Energy Transfer Energy exists in many forms, and when these forms change, energy is conserved. (HS-PS3-1), (HS-PS3-3), (HS-PS3-4) - pg.. 60 & 61	
<u>Unit 2: Atomic Structure and Nuclear Chemistry</u>	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 Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (HS-PS1-1) - pg.. 54 PS1.B Chemical Reactions The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2),(HS-PS1- 7) - pg.. 56 PS1.C Nuclear Processes Nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involve release or absorption of energy. The total number of neutrons plus protons does not change in any nuclear process. (HS-PS1- 8) - pg.. 54 Spontaneous radioactive decay follows a characteristic exponential decay law allowing an element's half-life to be used for radiometric dating of rocks and other materials. (secondary to HS-ESS1- 5),(secondary to HS-ESS1-6) - pg.. 75 PS3.D Nuclear Fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation. (secondary to HS-ESS1-1) - pg. 73 PS4.A Wave Properties The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing. (HS-PS4-1) - pg.. 62 PS4.B Electromagnetic Radiation Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities. (secondary HS-ESS1-2) - pg.. 73 When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat). Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize	pg. 54 pg. 56 pg. 62 pg. 73 pg. 75

		atoms and cause damage to living cells. (HS-PS4-4) - pg. 62 & 63 PS4.C Information Technologies and Instrumentation Multiple technologies based on the understanding of waves and their interactions with matter are part of everyday experiences in the modern world (e.g., medical imaging, communications, scanners) and in scientific research. They are essential tools for producing, transmitting, and capturing signals and for storing and interpreting the information contained in them. (HS-PS4-5) - pg.. 62	
<u>Unit 3: Formulas and Equations</u>	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 The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms.(HS-PS1-3),(secondary toHS-PS2-6) - pg.. 54 PS1.B Chemical Reactions The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2),(HS-PS1- 7) - pg.. 56	pg. 54 pg. 56
<u>Unit 4: Moles and Stoichiometry</u>	HS-PS1-4 HS-PS1-7	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: PS1.B Chemical Reactions The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2),(HS-PS1- 7) - pg.. 56 PS3.B Conservation of Energy and Energy Transfer Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (HS-PS3-1) - pg.. 60	pg. 56 pg. 60
<u>Unit 5: Gasses</u>	HS-PS1-3 HS-PS1-9	Developing conceptual understanding, problem solving routines, and laboratory-based skills in the following areas: PS1.A Structure and Properties of Matter The concept of an ideal gas is a model to explain the behavior of gasses. A real gas is most like an ideal gas when the real gas is at low pressure and high temperature. (HS-PS1-9) - pg.. 54 PS2.B Types of Interactions Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. (secondary to HS-PS1-1),(secondary to HS-PS1-3),(HS-PS2-6) - pg.. 54 PS3.B Conservation of Energy and Energy Transfer	pg. 54 pg. 60

		Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (HS-PS3-1) - pg. 60	
<u>Unit 6: Periodic Table of Elements</u>	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 The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. (HS-PS1-1) - pg.. 54 PS1.B Chemical Reactions The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2),(HS-PS1- 7) - pg. 56	pg. 54 pg. 56
<u>Unit 7: Bonding</u>	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 A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (HS-PS1-4) - pg.. 56 PS1.B Chemical Reactions The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2),(HS-PS1- 7) - pg.. 56 PS2.B Types of Interactions Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. (secondary to HS-PS1-1),(secondary to HS-PS1-3),(HS-PS2-6) - pg. 54 PS3.B Conservation of Energy and Energy Transfer Uncontrolled systems always evolve toward more stable states— that is, toward more uniform energy distribution (HS-PS3-4) - pg. 60	pg. 54 pg. 56 pg. 60
<u>Unit 8: Solutions</u>	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 Solutions possess characteristic properties that can be described qualitatively and quantitatively. (HS-PS1- 10) - pg. 54 PS2.B Types of Interactions	pg. 54

		Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. (secondary to HS-PS1- 1), (secondary to HS-PS1-3),(HS-PS2-6) - pg.. 54	
<u>Unit 9: Kinetics and Equilibrium</u>	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 A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (HS-PS1-4) - pg.. 56 PS1.B Chemical Reactions Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of particles and the rearrangements of particles into new substances, with consequent changes in the sum of all bond energies in the set of substances that are matched by changes in energy. (HS-PS1-4),(HS-PS1-5) - pg.. 56 In many situations, a dynamic and condition dependent balance between a reaction and the reverse reaction determines the numbers of all types of particles present. (HSPS1-6) - pg.. 56	pg. 56
<u>Unit 10: Acids, Bases, and Salts</u>	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 The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. - pg.. 54 PS1.B Chemical Reactions) Acids and bases play an important role in the daily lives of humans and other organisms (e.g. agricultural applications, environmental impacts (acid rain), animal and plant physiology). (HS-PS1-11) - pg.. 56	pg. 54 pg. 56
<u>Unit 11: Redox and Electrochemistry</u>	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 The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms.(HS-PS1-3),(secondary toHS-PS2-6) - pg.. 56 PS1.B Chemical Reactions Oxidation-reduction reactions are the prevailing source of power for many of today's modern conveniences. (HS-PS1-12) - pg.. 56 & 57	pg. 56 pg. 57
<u>Unit 12: Organic Chemistry</u>	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	pg. 56 pg. 54

		The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms.(HS-PS1-3),(secondary toHS-PS2-6) - pg.. 54 PS1.B Chemical Reactions The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2),(HS-PS1- 7) - pg.. 56	
<u>Additional Notes</u>			