

CURRICULUM MAP

COURSE TITLE: QPS-H

	September	October	November-December	December-January	January
Essential Questions	<ol style="list-style-type: none"> 1. Why is a uniform measuring system important to scientists? 2. What tools do scientists use and how do they measure precisely with them? 3. How do scientists utilize dimensional analysis as an aid in problem solving? 4. Why are significant figures important to scientists? 	<ol style="list-style-type: none"> 1. What is motion and how is it measured? 	<ol style="list-style-type: none"> 1. What is a vector and how is it utilized in science? 2. How can the mathematical operation of addition be generalized for use on vectors? 	<ol style="list-style-type: none"> 1. How can Newton's Laws predict and explain the behavior of objects in motion? 	<ol style="list-style-type: none"> 1. What effect does work have on the energy of a system? 2. What types of energy can be stored and transferred in a system? 3. What effect does impulse have on momentum? 4. When and how is momentum conserved?
Content	<ul style="list-style-type: none"> · Accuracy and precision in measurements. · Significant figures in calculations. · Scientific notation · Density. · SI prefixes 	<ul style="list-style-type: none"> · Position-time, velocity-time and acceleration-time graphs · Scalar vs. vector quantities · Displacement vs. Distance · Speed vs. Velocity · Uniform motion in 1 dimension · Uniform acceleration 	<ul style="list-style-type: none"> · Vectors · Vector addition · Vector resolution 	<ul style="list-style-type: none"> · Forces · Inertia · Newton's Laws · Forces in equilibrium and non-equilibrium situations 	<ul style="list-style-type: none"> · Momentum · Conservation of Momentum · Elastic and inelastic collisions · Energy · Work · Power · Conservation of energy
Skills	<ul style="list-style-type: none"> · Perform calculations using sig figs and scientific notation · Perform density calculations. · Perform unit conversions using dimensional analysis. · Apply dimensional analysis to solve qualitative problems 	<ul style="list-style-type: none"> · Construct and interpret graphs of motion · Describe 1 dimensional motion using graphs and equations · Distinguish between velocity and acceleration · Solve motion problems 	<ul style="list-style-type: none"> · Define vectors · Add vectors in 1 dimension · Add vectors at right angles · Add vectors in 2 dimensions · Resolve vectors into orthogonal components · Determine a component sum · Use the arctangent function to determine the angle of a vector sum · Evaluate the resultant and equilibrant of multiple vectors 	<ul style="list-style-type: none"> · Explain force · Explain Inertia · Explain Newton's Laws of motion · Analyze and solve problems using Newton's 2nd Law · Generate, interpret and utilize free body diagrams 	<ul style="list-style-type: none"> · Define momentum · Describe the law of Conservation of Momentum · Perform momentum calculations · Analyze and solve collision problems · Compare and Contrast kinetic and potential energy · Define work · Relate work to energy - the work-energy theorem · Define Power · Solve work, power and energy problems · Explain the law of conservation of energy
NJ Standards	5.1, 5.3, 5.11	5.1, 5.3, 5.4, 5.5, 5.11	5.1, 5.3, 5.7, 5.11, 5.19	5.1, 5.3, 5.5, 5.6, 5.7, 5.11	5.1, 5.3, 5.6, 5.8, 5.11
Assessments	<ul style="list-style-type: none"> · Investigative Lab – The Sun Scale · Investigative Lab – Solar Sytem Scale Model Conversions with Excel · Homework · Quizzes · Test · Lab Report 	<ul style="list-style-type: none"> · Investigative Lab – Mr. S on Blades · Investigative Lab – Matching a D vs. T Graph · Homework · Quizzes · Tests · Lab Reports 	<ul style="list-style-type: none"> · Inv. Lab - Vector Addition · Inv. Lab - Force Tables · Homework · Quizzes · Tests · Lab Reports 	<ul style="list-style-type: none"> · Investigative lab - Newton's 2nd Law (aka "Getting Pushy") · Homework · Quizzes · Test · Lab Reports 	<ul style="list-style-type: none"> · Inv. Lab - Momentum and Collisions · Homework · Quizzes, Test · Lab Reports · "Mid-Year Reflection" Physics PowerPoint presentation (Tentative)

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COURSE TITLE: QPS-H

	February	March	April	May	June
Essential Questions	1. How does the structure of an atom determine its chemical behavior?	1. How do scientists describe chemical compounds? 2. What is a mole and how is it utilized in chemistry?	1. How do chemists interpret chemical equations? 2. How are chemical equations useful to chemists?	1. How does energy interact with matter? (Depth optional)	1. How can the behavior of gases be quantified? (Optional) 2. What geological and meteorological processes and cycles have been and are continuously altering our planet (Required)
Content	<ul style="list-style-type: none"> · Classification of matter · Atomic mass and mass number · Protons, neutrons and electrons. · Atoms and isotopes. · Valence electrons · Ions, anions and cations. 	<ul style="list-style-type: none"> · Ionic and molecular compounds. · Moles and Avagadro's number. · Molar mass, molar volume, and representative particles. · Atoms, ions and molecules. · Empirical and molecular formulas. 	<ul style="list-style-type: none"> · Types of chemical equations. · Reactants and products. · Five, primary types of chemical reactions – synthesis, decomposition, single replacement, double replacement and combustion. · Stoichiometry. · Mole ratios. 	<ul style="list-style-type: none"> · States of matter · Kinetic Molecular theory · Phase diagrams · Heat flow in phase changes · Specific heat · Heat of fusion/vaporization 	Optional topics: <ul style="list-style-type: none"> · Kinetic Molecular theory · Relationships between pressure, volume and temperature · The 3 Gas Laws & the Ideal Gas Law · The evolution of continental drift to plate tectonics and our understanding of our ever-changing planet cycles (ie.-convection currents, rock, water)
Skills	<ul style="list-style-type: none"> · Define elements, compounds and types of mixtures. · Conclude the atomic mass, mass number, number of protons, neutrons and electrons in a nuclide. · Calculate average atomic mass given isotopic abundance. · Explain Bohr's model of the atom. · Explain the law of multiple proportions. · Identify the parts of the atom. 	<ul style="list-style-type: none"> · Conclude the chemical formulas for binary ionic, tertiary ionic and binary molecular compounds, given their names. · Conclude the chemical name for ionic and molecular compounds, given their formulas. · Calculate the molar mass of a substance. · Convert between mass, moles, representative particles and volume of a substance. · Calculate the percent composition of a compound. · Conclude the empirical and molecular formula of a substance, given its % comp. and molar mass. 	<ul style="list-style-type: none"> · Balance chemical equations. · Identify a chemical reaction as one of the five given types of reactions. · Properly predict the products of a chemical reaction, given the reactants. · Utilize the activity series in predicting single replacement reactions. · Perform stoichiometric calculations for the reactants and products in a chemical reaction (ie.-mole-mole, mass-mass, volume-volume, mass-volume, etc.) 	<ul style="list-style-type: none"> · Identify the states of matter · Explain the kinetic molecular theory · Calculate heat gain or loss within a system · Calculate specific heat of a substance · Distinguish between fusion and vaporization 	<ul style="list-style-type: none"> · Explain the relationships between pressure, volume and temperature · Solve gas law problems · Explain and identify the causes and effects of plate tectonics and the atmospheric and geological cycles of Earth that have shaped our planet and made it unique
NJ Standards	5.1, 5.2, 5.4, 5.5, 5.11, 5.24	5.1, 5.3, 5.4, 5.6	5.1, 5.3, 5.4, 5.5, 5.7, 5.11	5.1, 5.3, 5.4, 5.5, 5.7, 5.8, 5.11	5.1, 5.3, 5.5, 5.6, 5.7, 5.11
Assessments	<ul style="list-style-type: none"> · Homework · Quizzes · Test · Lab Report 	<ul style="list-style-type: none"> · Inv. Lab – Composition of Hydrated Salt · Homework · Quizzes · Test · Lab Report 	<ul style="list-style-type: none"> · PowerPoint presentations to "self-teach" the types · Inv. Lab – Activity Series of Metals · Inv. Lab – Chemical Reactions. · Inv. Lab – Stoichiometric Calc. · Homework, Quizzes, Test, Lab Report 	<ul style="list-style-type: none"> · Inv. Lab – Heat of Fusion of Ice · Homework · Quizzes · Test · Lab Report 	<ul style="list-style-type: none"> · Inv. Labs – Boyle's & Charles' Laws · Inv. Lab – Locating Epicenters of Earthquakes · Homework · Quizzes · Test · Lab Report