



Grade 10 Chemistry Marking Period 4

STANDARD	PERFORMANCE INDICATORS	PACING DAYS	RESOURCES (Print, Visual, Technology, Manipulatives)	ASSESSMENT (Evidence & Scoring Guides)
Unit 8: Kinetics and Equilibrium				
P.S.4.3D CH	<ul style="list-style-type: none"> Students use kinetic molecular theory (KMT) to explain rates of reactions and the relationships among temperature, pressure, and volume of a substance. 	7	<ul style="list-style-type: none"> Match Stick Demo Glo Sticks Timer Potential Energy Diagram 	<ul style="list-style-type: none"> Glo Sticks
P.S.4.3D4 CH	<ul style="list-style-type: none"> Collision theory states that a reaction is most likely to occur if reactant particles collide with the proper energy and orientation. 			
P.S.4.3D6 CH	<ul style="list-style-type: none"> The rate of a chemical reaction depends on several factors: temperature, concentration, nature of the reactants, surface area, and the presence of a catalyst. 			
P.S.4.4A CH	<ul style="list-style-type: none"> Students observe and describe transmission of various forms of energy. 			
P.S.4.4A1 CH	<ul style="list-style-type: none"> Energy can exist in different forms, such as chemical, electrical, electromagnetic, thermal, mechanical, and nuclear. 			
P.S.4.4A2 CH	<ul style="list-style-type: none"> Chemical and physical changes can be exothermic or endothermic. 			
P.S.4.4A3 CH	<ul style="list-style-type: none"> Energy released or absorbed during a chemical 			



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	reaction can be represented by a potential energy diagram.			
P.S.4.4A4 CH	<ul style="list-style-type: none"> • Energy released or absorbed during a chemical reaction (heat of reaction) is equal to the difference between the potential energy of the products and potential energy of the reactants. 			
P.S.4.3D7 CH	<ul style="list-style-type: none"> • A catalyst provides an alternate reaction pathway, which has lower activation energy than a non-catalyzed reaction. 			
P.S.4.3D8 CH	<ul style="list-style-type: none"> • Some chemical and physical changes can reach equilibrium. 			
P.S.4.3D9 CH	<ul style="list-style-type: none"> • At equilibrium the rate of the forward reactions equals the rate of the reverse reaction. The measurable quantities of reactant and products remain constant at equilibrium. 			
P.S.4.3D10 CH	<ul style="list-style-type: none"> • LeChatelier's principle can be used to predict the effect of stress (change in pressure, volume, concentration, and temperature) on a system at equilibrium. 			
P.S.4.3	<ul style="list-style-type: none"> • Matter is made up of particles whose properties 			



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	determine the observable characteristics of matter and its reactivity.			
P.S.4.3 CH	<ul style="list-style-type: none"> Students explain the properties of materials in terms of the arrangement and properties of the atoms that compose them. 			
P.S.4.3A38 CH	<ul style="list-style-type: none"> Entropy is a measure of the randomness or disorder of a system. A system with greater disorder has greater entropy. 			
P.S.4.3A39 CH	<ul style="list-style-type: none"> Systems in nature tend to undergo changes toward lower energy and higher entropy. 			
Unit 9: Oxidation and Reduction				
P.S.4.3	<ul style="list-style-type: none"> Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity. 	9	<ul style="list-style-type: none"> Textbook Battery Demo 	
P.S.4.3B CH	<ul style="list-style-type: none"> Students use atomic and molecular models to explain common chemical reactions. 			
P.S.4.3B4 CH	<ul style="list-style-type: none"> An oxidation-reduction (redox) reaction involves the transfer of electrons (e⁻). 			
P.S.4.3B5 CH	<ul style="list-style-type: none"> Reduction is the gain of electrons. 			



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P.S.4.3B6 CH	<ul style="list-style-type: none"> A half-reaction can be written to represent reduction. 			
P.S.4.3B7 CH	<ul style="list-style-type: none"> Oxidation is the loss of electrons. 			
P.S.4.3B8 CH	<ul style="list-style-type: none"> A half-reaction can be written to represent oxidation. 			
P.S.4.3B9 CH	<ul style="list-style-type: none"> Oxidation numbers (states) can be assigned to atoms and ions. Changes in oxidation numbers indicate that oxidation and reduction have occurred. 			
P.S.4.3B10 CH	<ul style="list-style-type: none"> An electrochemical cell can be either voltaic or electrolytic. In an electrochemical cell, oxidation occurs at the anode and reduction at the cathode. 			
P.S.4.3B11 CH	<ul style="list-style-type: none"> A voltaic cell spontaneously converts chemical energy to electrical energy. 			
P.S.4.3B12 CH	<ul style="list-style-type: none"> An electrolytic cell requires electrical energy to produce a chemical change. This process is known as electrolysis. 			
P.S.4.3C CH	<ul style="list-style-type: none"> Students apply the principle of conservation of mass to chemical reactions. 			
P.S.4.3C1 CH	<ul style="list-style-type: none"> In all chemical reactions there is a conservation 			



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	of mass, energy, and charge.			
P.S.4.3C2 CH	<ul style="list-style-type: none"> In a redox reaction the number of electrons lost is equal to the number of electrons gained. 			
P.S.4.3C3 CH	<ul style="list-style-type: none"> A balanced chemical equation represents conservation of atoms. The coefficients in a balanced chemical equation can be used to determine mole ratios in the reaction. 			
Unit 10: Acids, Bases, Salts				
P.S.4.3	<ul style="list-style-type: none"> Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity. 	12	<ul style="list-style-type: none"> Chemical Equipment Buret Chemical Equipment Calculator Indicators Salts 	<ul style="list-style-type: none"> Acid Base Properties Lab Titration Lab pH Lab Hydrolysis Lab Ball and Stick Lab Mystery Matter Lab
P.S.4.3A CH	<ul style="list-style-type: none"> Students explain the properties of materials in terms of the arrangement and properties of the atoms that compose them. 			
P.S.4.3A44 CH	<ul style="list-style-type: none"> An electrolyte is a substance which, when dissolved in water, forms a solution capable of conducting an electric current. The ability of a solution to conduct an electric current depends on the concentration of ions. 			
P.S.4.3A45 CH	<ul style="list-style-type: none"> The acidity or alkalinity of an aqueous solution 			



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	<p>can be measured by its pH value. The relative level of acidity or alkalinity of these solutions can be shown by using indicators.</p>			
P.S.4.3A46 CH	<ul style="list-style-type: none"> On the pH scale, each decrease of one unit of pH represents a tenfold increase in hydronium ion concentration. 			
P.S.4.3B47 CH	<ul style="list-style-type: none"> Behavior of many acids and based can be explained by the Arrhenius theory. Arrhenius acids and bases are electrolytes. 			
P.S.4.3A48 CH	<ul style="list-style-type: none"> Arrhenius acids yield $H^+(aq)$, hydrogen ion as the only positive ion in an aqueous solution. They hydrogen ion may also be written as $H_3O^+(aq)$, hydronium ion. 			
P.S.4.3A49 CH	<ul style="list-style-type: none"> Arrhenius bases yield $OH^-(aq)$, hydroxide ion as the only negative ion in an aqueous solution. 			
P.S.4.3A50 CH	<ul style="list-style-type: none"> In the process of neutralization, an Arrhenius acid and an Arrhenius base react to form salt and water. 			
P.S.4.3A51 CH	<ul style="list-style-type: none"> There are alternate acid-base theories. One theory states that an acid is an H^+ donor and a base is an 			



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	H ⁺ acceptor.			
P.S.4.3A51 CH	<ul style="list-style-type: none"> There are alternate acid-base theories. One theory states that an acid is an H⁺ donor and a base is an H⁺ acceptor. 			
P.S.4.3A52 CH	<ul style="list-style-type: none"> Titration is a laboratory process in which a volume of a solution of known concentration is used to determine the concentration of another solution. 			
Unit 11: Organic Chemistry				
P.S.4.3	<ul style="list-style-type: none"> Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity. 	13	<ul style="list-style-type: none"> Ball & Stick Model Kits Videos Web Sites 	<ul style="list-style-type: none"> Titration Lab pH Lab Hydrolysis Lab Ball & Stick Lab Mystery Matter Lab
P.S.4.3A CH	<ul style="list-style-type: none"> Students explain the properties of materials in terms of the arrangement and properties of the atoms that compose them. 			
P.S.4.3A32 CH	<ul style="list-style-type: none"> Organic compounds contain carbon atoms, which bond to one another in chains, rings, and networks to form a variety of structures. Organic compounds can be named using the IUPAC system. 			



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P.S.4.3A33 CH	<ul style="list-style-type: none"> Hydrocarbons are compounds that contain only carbon and hydrogen. Saturated hydrocarbons contain only single carbon-carbon bonds. Unsaturated hydrocarbons contain at least one multiple carbon-carbon bond. 			
P.S.4.3A34 CH	<ul style="list-style-type: none"> Organic acids, alcohols, esters, aldehydes, ketones, ethers, halides, amines, amides, and amino acids are categories of organic compounds that differ in their structures. Functional groups impart distinctive physical and chemical properties to organic compounds. 			
P.S.4.3B3 CH	<ul style="list-style-type: none"> Types of organic reactions include addition, subtraction, polymerization, esterification, fermentation, saponification, and combustion. 			
P.S.4.5	<ul style="list-style-type: none"> Energy and matter interact through forces that result in changes in motion. 			
P.S.4.5B CH	<ul style="list-style-type: none"> Students explain chemical bonding in terms of the behavior of electrons. 			
P.S.4.5B4 CH	<ul style="list-style-type: none"> In a multiple covalent bond, more than one pair of electrons is shared between two atoms. Unsaturated organic compounds contain at least 			



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	one double or triple bond.			
Unit 12: Nuclear Chemistry				
P.S.4.3A CH	<ul style="list-style-type: none"> Students explain the properties of materials in terms of the arrangement and properties of the atoms that compose them. 	5	<ul style="list-style-type: none"> M&M's Plastic Cups Twizzlers Rulers 	<ul style="list-style-type: none"> M&M Half Life Lab Twizzler Lab Homework Quizzes Exams
P.S.4.3A15 CH	<ul style="list-style-type: none"> Stability of an isotope is based on the ratio of neutrons and protons in its nucleus. Although most nuclei are stable, some are unstable and spontaneously decay, emitting radiation. 			
P.S.4.3A16 CH	<ul style="list-style-type: none"> Spontaneous decay can involve the release of alpha particles, beta particles, positrons, and/or gamma radiation from the nucleus of an unstable isotope. These emissions differ in mass, charge, ionizing power, and penetrating power. 			
P.S.4.4	<ul style="list-style-type: none"> Energy exists in many forms, and when these forms change energy is conserved. 			
P.S.4.4D CH	<ul style="list-style-type: none"> Students explain the benefits and risks of radioactivity. 			
P.S.4.4D1 CH	<ul style="list-style-type: none"> Each radioactive isotope has a specific mode and rate of decay (half-life). 4.4b Nuclear reactions 			



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	include natural and artificial transmutation, fission, and fusion.			
P.S.4.4D2 CH	<ul style="list-style-type: none"> Nuclear reactions can be represented by equations that include symbols which represent atomic nuclei (with mass number and atomic number), subatomic particles (with mass number and charge), and/or emissions such as gamma radiation. 			
P.S.4.4D3 CH	<ul style="list-style-type: none"> Radioactive isotopes have many beneficial uses. Radioactive isotopes are used in medicine and industrial chemistry for radioactive dating, tracing chemical and biological processes, industrial measurement, nuclear power, and detection and treatment of diseases. 			
P.S.4.4D4 CH	<ul style="list-style-type: none"> There are inherent risks associated with radioactivity and the use of radioactive isotopes. Risks can include biological exposure, long-term storage and disposal, and nuclear accidents. 			
P.S.4.4D5 CH	<ul style="list-style-type: none"> There are benefits and risks associated with fission and fusion reactions. 			
P.S.4.5	<ul style="list-style-type: none"> Energy and matter interact through forces that 			



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	result in changes in motion.			
P.S.4.5C CH	<ul style="list-style-type: none"> • Students can compare energy relationships within an atom's nucleus to those outside the nucleus. 			
P.S.4.5C1 CH	<ul style="list-style-type: none"> • A change in the nucleus of an atom that converts it from one element to another is called transmutation. This can occur naturally or can be induced by the bombardment of the nucleus with high-energy particles. 			
P.S.4.5C2 CH	<ul style="list-style-type: none"> • Energy released in a nuclear reaction (fission or fusion) comes from the fractional amount of mass that is covered into energy. Nuclear changes convert matter into energy. 			
P.S.4.5C3 CH	<ul style="list-style-type: none"> • Energy released during nuclear reactions is much greater than the energy released during chemical reactions. 			



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Curriculum Guidelines for Fourth Quarter

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| <ul style="list-style-type: none"> • Kinetics • Solutions • Spontaneous Process • Equilibrium • Acids • Bases • Conjugate Acids/Bases • Neutralization | <ul style="list-style-type: none"> • pH • Redux Reaction • Electrochemistry • Physical and Chemicals Properties of Organic Compounds • Homologous Series • Organic Reactions • Nuclear Chemistry Principles • Nuclear Chemistry Benefits & Risks |
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