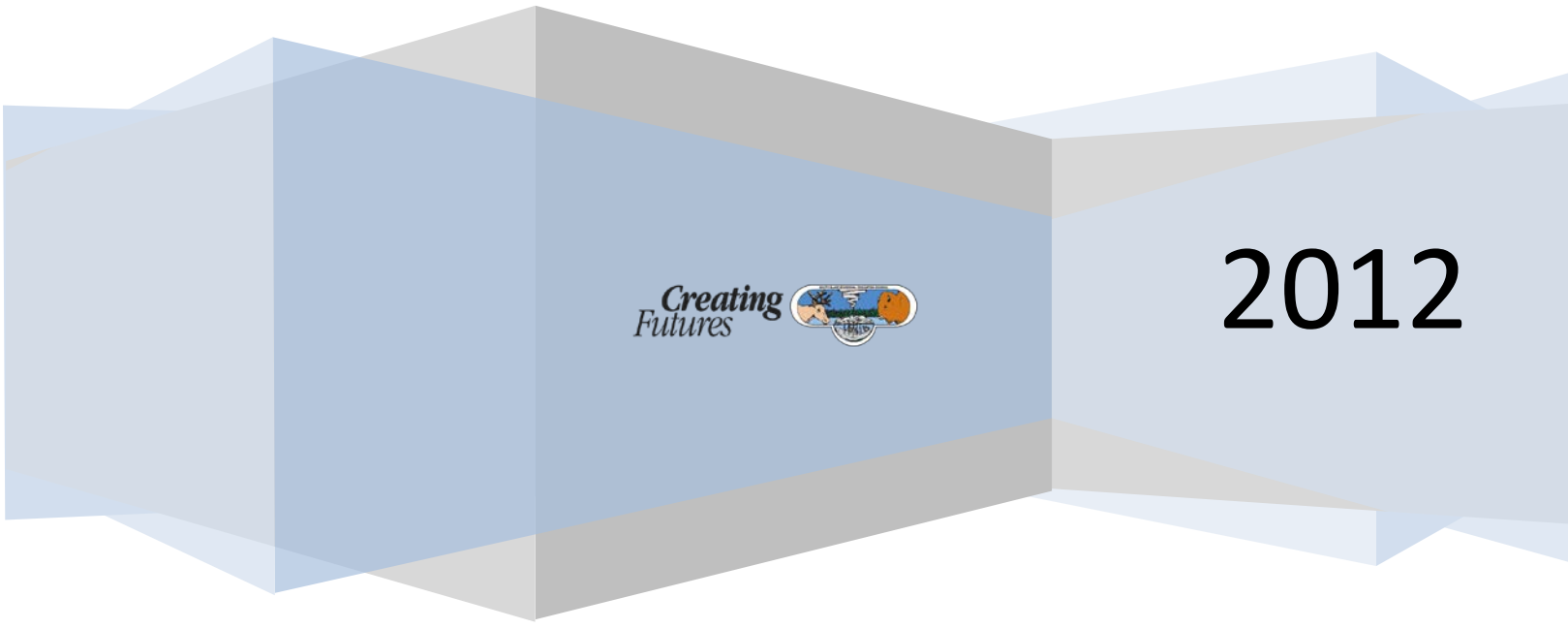
South Slave Divisional Education Council

Chemistry 20

Curriculum Package

February 2012



Unit A: The Diversity of Matter and Chemical Bonding

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Focusing Questions: Why do some substances dissolve easily, whereas others do not? Why do different substances have different melting and boiling points and enthalpies of fusion and vaporization? How can models increase understanding of bonding?	
1 GENERAL OUTCOMES: STUDENTS WILL DESCRIBE THE ROLE OF MODELLING, EVIDENCE AND THEORY IN EXPLAINING AND UNDERSTANDING THE STRUCTURE, CHEMICAL BONDING AND PROPERTIES OF IONIC COMPOUNDS.	
Knowledge: Students will describe the role of modelling, evidence and theory in explaining and understanding the structure, chemical bonding and properties of ionic compounds.	• Recall principles for assigning names to ionic compounds • Explain why formulas for ionic compounds refer to the simplest whole-number ratio of ions that result in a net charge of zero • Define valence electron, electronegativity, ionic bond and intramolecular force • Use the periodic table and electron dot diagrams to support and explain ionic bonding theory • Explain how an ionic bond results from the simultaneous attraction of oppositely charged ions • Explain that ionic compounds form lattices and that these structures relate to the compounds' properties; e.g., melting point, solubility, reactivity.
Explain that the goal of science is knowledge about the natural world **Specific Outcomes for Science, Technology and Society (STS)** (Nature of Science Emphasis)	• Identify everyday processes and products in which ionic compounds are significant, such as in the composition of household products and foods and in life processes
Explain that scientific knowledge and theories develop through hypotheses, the collection of evidence, investigation and the ability to provide explanations	• Describe how an understanding of electronegativity contributes to knowledge of relative bond strength, melting points and boiling points of ionic compounds
Explain that scientific knowledge may lead to the development of new technologies, and new technologies may lead to or facilitate scientific discovery	• Explain how scientific research and technology interact in the production and distribution of beneficial materials, such as semiconductors, ceramics and composite materials.
SKILLS OUTCOMES: (embed throughout the unit)	
Initiating and Planning: Formulate questions about observed relationships; plan investigations of questions, ideas, problems and issues	• Design an investigation to determine the properties of ionic compounds (solubility, conductivity and melting point) • Describe procedures for the safe handling, storage and disposal of materials used in the laboratory, with reference to WHMIS and consumer product labelling information • Research the question, "should all scientific research have a practical application?" • Design an experiment to explore the formation of ionic compounds.
Performing and Recording: Conduct investigations into relationships between and among observable variables and use a broad range of tools and techniques to gather and record data and information	• Draw electron dot diagrams • Build models of ionic solids • Perform an investigation to illustrate properties of ionic compounds • Use the periodic table to make predictions about bonding and nomenclature • Use model-building software to collect and integrate information on the structure of ionic crystals.

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Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions	• Analyze experimental data to determine the properties of ionic compounds • Use data from various sources to predict the strength of bonds between ions.
Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results	• Use appropriate International System of Units (SI) notation, fundamental and derived units and significant digits • Use appropriate numeric, symbolic, graphical and linguistic modes of representation to communicate ideas, plans and results • Analyze, critically, models of ionic compounds built by others .
2 GENERAL OUTCOMES: STUDENTS WILL DESCRIBE THE ROLE OF MODELLING, EVIDENCE AND THEORY IN EXPLAINING AND UNDERSTANDING THE STRUCTURE, CHEMICAL BONDING AND PROPERTIES OF MOLECULAR SUBSTANCES.	
Students will describe the role of modelling, evidence and theory in explaining and understanding the structure, chemical bonding and properties of molecular substances.	• Recall principles for assigning names to molecular substances • Explain why formulas for molecular substances refer to the number of atoms of each constituent element • Relate electron pairing to multiple and covalent bonds • Draw electron dot diagrams of atoms and molecules, writing structural formulas for molecular substances and using Lewis structures to predict bonding in simple molecules • Apply VSEPR theory to predict molecular shapes for linear, angular (V-shaped, bent), tetrahedral, trigonal pyramidal and trigonal planar molecules • Illustrate, by drawing or by building models, the structure of simple molecular substances • Explain intermolecular forces, London (dispersion) forces, dipole-dipole forces and hydrogen bonding • Relate properties of substances (e.g., melting and boiling points, enthalpies of fusion and vaporization) to the predicted intermolecular bonding in the substances • Determine the polarity of a molecule based on simple structural shapes and unequal charge distribution • Describe bonding as a continuum ranging from complete electron transfer to equal sharing of electrons.
Explain that the goal of science is knowledge about the natural world **Specific Outcomes for Science, Technology and Society (STS)** (Nature of Science Emphasis	• Identify everyday processes and products in which molecular substances are significant, such as in the composition of household products and foods and in life processes • Identify examples of processes and products in which molecular substances are significant, such as in the use of adhesives and rubber by Aboriginal peoples
Explain that scientific knowledge and theories develop through hypotheses, the collection of evidence, investigation and the ability to provide explanations	• Relate chemical properties to predicted intermolecular bonding by investigating melting and boiling points
Explain that scientific knowledge is subject to change as new evidence becomes apparent and as laws and theories are tested and subsequently revised, reinforced or rejected	• Explain how scientific research and technology interact in the production and distribution of beneficial materials, such as polymers, household products and solvents • Investigate how basic knowledge about the structure of matter is advanced through nanotechnology research and development.

Unit A: The Diversity of Matter and Chemical Bonding

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
SKILLS OUTCOMES: (embed throughout the unit)	
Initiating and Planning: Formulate questions about observed relationships; plan investigations of questions, ideas, problems and issues	• State a hypothesis and make a prediction about the properties of molecular substances based on attractive forces; e.g., melting or boiling point, enthalpies of fusion and vaporization • Describe procedures for the safe handling, storage and disposal of materials used in the laboratory, with reference to WHMIS and consumer product labelling information
Performing and Recording: Conduct investigations into relationships between and among observable variables and use a broad range of tools and techniques to gather and record data and information	• Build models depicting the structure of simple covalent molecules, including selected organic compounds • Carry out an investigation to determine the melting or boiling point of a molecular substance • Use a thermometer and a conductivity apparatus to collect data • Carry out an investigation to compare the physical properties of molecular substances
Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions	• Graph and analyze data, for trends and patterns, on the melting and boiling points of a related series of molecular substances.
Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results	• Analyze and evaluate, objectively, models and graphs constructed by others • Research the ways that scientists develop and analyze new materials.

Unit B: Forms of Matter - Gases

Focusing Questions: How do familiar observations of gases relate to specific scientific models describing the behaviour of gases? What is the relationship among the pressure, temperature, volume and amount of a gas? How is the behaviour of gases used in various technologies?	
1 GENERAL OUTCOMES: STUDENTS WILL EXPLAIN MOLECULAR BEHAVIOUR, USING MODELS OF THE GASEOUS STATE OF MATTER	
Knowledge: Students will explain molecular behaviour, using models of the gaseous state of matter.	• Describe and compare the behaviour of real and ideal gases in terms of kinetic molecular theory • Convert between the Celsius and kelvin temperature scales • Explain the law of combining volumes • Illustrate how Boyle's and Charles's laws, individually and combined, are related to the ideal gas law ($PV = nRT$) • Express pressure in a variety of ways, including units of kilopascals, atmospheres and millimetres of mercury • Perform calculations, based on the gas laws, under STP, SATP and other defined conditions.
Explain that science provides a conceptual and theoretical basis for predicting, interpreting and explaining natural and technological phenomena **Science, Technology and Society (STS)** (Nature of Science Emphasis)	• Describe how the development of technologies capable of precise measurements of temperature and pressure (such as thermocouples, thermistors and Bourdon gauges) led to a better understanding of gases and to the formulation of the gas laws

Unit B: Forms of Matter - Gases

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Explain that the goal of science is knowledge about the natural world	• Describe examples of natural phenomena and processes and products (such as breathing, diffusion, weather, hot air balloons, scuba diving equipment, automobile air bags, gas turbines and internal combustion engines) that illustrate the properties of gases.
SKILLS OUTCOMES: (embed throughout the unit)	
Initiating and Planning: Formulate questions about observed relationships; plan investigations of questions, ideas, problems and issues	• State hypotheses and make predictions based on information about the pressure, temperature and volume of a gas • Describe procedures for the safe handling, storage and disposal of materials used in the laboratory, with reference to WHMIS and consumer product labelling information
Performing and Recording: Conduct investigations into relationships between and among observable variables and use a broad range of tools and techniques to gather and record data and information	• Conduct investigations into relationships among observable variables and use a broad range of tools and techniques to gather and record data and information • Perform an experiment, in which variables are identified and controlled, to illustrate gas laws • Use thermometers, balances and other measuring devices effectively to collect data on gases • Use library and electronic research tools to collect information on real and ideal gases and on applications of gases, such as hot air and weather balloons • Perform an investigation to determine molar mass from gaseous volume.
Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions	• Graph and analyze experimental data that relate pressure and temperature to gas volume (AI–NS2) • Identify the limitations of measurement (AI–NS4) • Identify a gas based on an analysis of experimental data
Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results	• Communicate questions, ideas and intentions and receive, interpret, understand, support and respond to the ideas of others while collecting data on gases (CT–NS1) • Prepare a group presentation, using multimedia, to illustrate how the pressure, temperature, volume and amount of a gas determines the universal gas constant

Unit C: Matter as Solutions, Acids and Bases

Focusing Questions:
How is matter as solutions, acids and bases differentiated on the basis of theories, properties and scientific evidence?
Why is an understanding of acid-base and solution chemistry important in our daily lives and in the environment?

1 GENERAL OUTCOMES: STUDENTS WILL INVESTIGATE SOLUTIONS, DESCRIBING THEIR PHYSICAL AND CHEMICAL PROPERTIES.

Knowledge: Students will investigate solutions, describing their physical and chemical properties.	• Recall the categories of pure substances and mixtures and explain the nature of homogeneous mixtures • Provide examples from living and nonliving systems that illustrate how dissolving substances in water is often a prerequisite for chemical change • Explain dissolving as an endothermic or exothermic process with respect to the breaking and forming of bonds • Differentiate between electrolytes and nonelectrolytes • Express concentration in various ways; i.e., moles per litre of solution, percent by mass and parts per million • Calculate, from empirical data, the concentration of solutions in moles per litre of solution and determine mass or volume from such concentrations

Unit C: Matter as Solutions, Acids and Bases

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Knowledge: Students will investigate solutions, describing their physical and chemical properties. (Continued)	• Calculate the concentrations and/or volumes of diluted solutions and the quantities of a solution and water to use when diluting • Use data and ionization/dissociation equations to calculate the concentration of ions in a solution • Define solubility and identify related factors; i.e., temperature, pressure and miscibility • Explain a saturated solution in terms of equilibrium; i.e., equal rates of dissolving and crystallization • Describe the procedures and calculations required for preparing and diluting solutions.
Explain how science and technology are developed to meet societal needs and expand human capability **Science, Technology and Society (STS)** (Social and Environmental Contexts Emphasis)	• Provide examples of how solutions and solution concentrations are applied in products and processes, scientific studies and daily life
Explain that science and technology have influenced, and been influenced by, historical development and societal needs	• Compare the ways in which concentrations of solutions are expressed in chemistry laboratories, household products and environmental studies
Explain that scientific and technological activity may arise from, and give rise to, such personal and social values as accuracy, honesty, perseverance, tolerance, open-mindedness, critical-mindedness, creativity and curiosity	• Explain the Responsible Care program developed by the Canadian Chemical Producers' Association
Explain how science and technology have both intended and unintended consequences for humans and the environment	• Explain the significance of biomagnification in increasing the concentration of substances in an ecosystem
Explain that the appropriateness, risks and benefits of technologies need to be assessed for each potential application from a variety of perspectives, including sustainability	• Explain the role of concentration in risk-benefit analyses for determining the safe limits of particular substances, such as pesticide residues, heavy metals, chlorinated or fluorinated compounds and pharmaceuticals.
SKILLS OUTCOMES: (embed throughout the unit)	
Initiating and Planning: Formulate questions about observed relationships; plan investigations of questions, ideas, problems and issues	• Design a procedure to identify the type of solution • Design a procedure to determine the concentration of a solution containing a solid solute • Describe procedures for the safe handling, storage and disposal of materials used in the laboratory, with reference to WHMIS and consumer product labelling information.
Performing and Recording: Conduct investigations into relationships between and among observable variables and use a broad range of tools and techniques to gather and record data and information	• Use a conductivity apparatus to differentiate solutions • Perform an experiment to determine the concentration of a solution • Use a balance and volumetric glassware to prepare solutions of specified concentrations • Perform an investigation to determine the solubility of a solute in a saturated solution.

Unit C: Matter as Solutions, Acids and Bases

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions	• Use experimental data to determine the concentration of a solution • Evaluate the risks involved in the handling, storage and disposal of solutions commonly used in the laboratory and in the home.
Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results	• Compare personal concentration data with the data collected by other individuals or groups • Select and use appropriate numeric, symbolic, graphical and linguistic modes of representation to communicate ideas, plans and results • Use integrated software effectively and efficiently to incorporate data, graphics and text • Conduct, collectively, a risk-benefit analysis of the pollution of waterways by the release of effluents and propose a plan for reducing the impact on the ecosystem
2 GENERAL OUTCOMES: STUDENTS WILL DESCRIBE ACIDIC AND BASIC SOLUTIONS QUALITATIVELY AND QUANTITATIVELY.	
Knowledge: Students will describe acidic and basic solutions qualitatively and quantitatively.	• Recall International Union of Pure and Applied Chemistry (IUPAC) nomenclature of acids and bases • Recall the empirical definitions of acidic, basic and neutral solutions determined by using indicators, pH and electrical conductivity • Calculate $H_3O^+(aq)$ and $OH^-(aq)$ concentrations and the pH and pOH of acidic and basic solutions based on logarithmic expressions; i.e., pH = –log[H3O$^+$] and pOH = –log[OH^-] • Use appropriate SI units to communicate the concentration of solutions and express pH and concentration answers to the correct number of significant digits; i.e., use the number of decimal places in the pH to determine the number of significant digits of the concentration • Compare magnitude changes in pH and pOH with changes in concentration for acids and bases • Explain how the use of indicators, pH paper or pH meters can be used to measure $H_3O^+(aq)$ • Define Arrhenius (modified) acids as substances that produce $H_3O^+(aq)$ in aqueous solutions and recognize that the definition is limited • Define Arrhenius (modified) bases as substances that produce $OH^-(aq)$ in aqueous solutions and recognize that the definition is limited • Define neutralization as a reaction between hydronium and hydroxide ions • Differentiate, qualitatively, between strong and weak acids and between strong and weak bases on the basis of ionization and dissociation; i.e., pH, reaction rate and electrical conductivity • Identify monoprotic and polyprotic acids and bases and compare their ionization/dissociation.
Explain that the goal of technology is to provide solutions to practical problems **Science, Technology and Society (STS)** (Science and Technology Emphasis)	• Relate the concept of pH to solutions encountered in everyday life, such as pharmaceuticals, shampoo and other cleaning products, aquatic and terrestrial environments, and blood/blood products
Explain that technological problems often require multiple solutions that involve different	• provide examples of processes and products that use knowledge of acid and base chemistry (the pulp and paper industry, the petrochemical industry, food preparation and preservation, cleaning aids, sulfuric acid in car batteries, treating accidental acid or base spills using neutralization and dilution)

Unit C: Matter as Solutions, Acids and Bases

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Explain that technological problems often require multiple solutions that involve different (Continued)	• Explain the significance of the strength and concentration of solutions in everyday life (pharmaceuticals, chemical spills, transportation of dangerous goods, toxicity) • Identify examples in Alberta in which holistic practices used by some Aboriginal communities can be used to moderate the impact of development in industries such as the petrochemical industry.
SKILLS OUTCOMES: (embed throughout the unit)	
Initiating and Planning: Formulate questions about observed relationships; plan investigations of questions, ideas, problems and issues	• Design an experiment to differentiate among acidic, basic and neutral solutions • Design an experiment to differentiate between weak and strong acids and between weak and strong bases • Describe procedures for the safe handling, storage and disposal of materials used in the laboratory, with reference to WHMIS and consumer product labelling information.
Performing and Recording: Conduct investigations into relationships between and among observable variables and use a broad range of tools and techniques to gather and record data and information	• Construct a table or graph to compare pH and hydronium ion concentration, illustrating that as the hydronium ion concentration increases, the pH decreases • Use a pH meter to determine the acidity and/or alkalinity of a solution.
Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions	• Use indicators to determine the pH for a variety of solutions • Assess, qualitatively, the risks and benefits of producing, using and transporting acidic and basic substances, based on WHMIS and transportation of dangerous goods guidelines.
Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results	• Research, collectively, the relationship between sulfuric acid and industrialization • Evaluate technologies used to reduce emissions that lead to acid deposition

Unit D: Quantitative Relationships in Chemical Changes

Focusing Questions:
How do scientists, engineers and technologists use mathematics to analyze chemical change?
How are balanced chemical equations used to predict yields in chemical reactions

1 GENERAL OUTCOME: STUDENTS WILL EXPLAIN HOW BALANCED CHEMICAL EQUATIONS INDICATE THE QUANTITATIVE RELATIONSHIPS BETWEEN REACTANTS AND PRODUCTS INVOLVED IN CHEMICAL CHANGES.

Knowledge: Explain how balanced chemical equations indicate the quantitative relationships between reactants and products involved in chemical changes.	• Predict the product(s) of a chemical reaction based upon the reaction type • Recall the balancing of chemical equations in terms of atoms, molecules and moles • Contrast quantitative and qualitative analysis • Write balanced ionic and net ionic equations, including identification of spectator ions, for reactions taking place in aqueous solutions • Calculate the quantities of reactants and/or products involved in chemical reactions, using gravimetric, solution or gas stoichiometry.

Unit D: Quantitative Relationships in Chemical Changes

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Explain that the products of technology are devices, systems and processes that meet given needs; however, these products cannot solve all problems **Science, Technology and Society (STS)** (Science and Technology Emphasis)	• Analyze the chemical reactions involved in various industrial and commercial processes and products that use stoichiometric and chemical principles: o Production of urea o Fertilizers o Fuel combustion o Water treatment o Air bag deployment o Neutralization of excess stomach acid.
SKILLS OUTCOMES: (embed throughout the unit)	
Initiating and Planning: Formulate questions about observed relationships; plan investigations of questions, ideas, problems and issues	• Plan and predict states, products and theoretical yields for chemical reactions • Design an experiment to identify an ion; e.g., precipitation, flame test • Describe procedures for the safe handling, storage and disposal of materials used in the laboratory, with reference to WHMIS and consumer product labelling information.
Performing and Recording: Conduct investigations into relationships between and among observable variables and use a broad range of tools and techniques to gather and record data and information	• Translate word equations for chemical reactions into chemical equations, including states of matter for the products and reactants • Balance chemical equations for chemical reactions, using lowest whole-number coefficients
Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions	• Interpret stoichiometric ratios from chemical reaction equations • Perform calculations to determine theoretical yields • Use appropriate SI notation, fundamental and derived units and significant digits when performing stoichiometric calculations.
Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results	• Use integrated software effectively and efficiently to incorporate data and text
2 GENERAL OUTCOMES: STUDENTS WILL USE STOICHIOMETRY IN QUANTITATIVE ANALYSIS.	
Knowledge: Students will use stoichiometry in quantitative analysis.	• Explain chemical principles (i.e., conservation of mass in a chemical change), using quantitative analysis • Identify limiting and excess reagents in chemical reactions • Define theoretical yields and actual yields • Explain the discrepancy between theoretical and actual yields • Draw and interpret titration curves, using data from titration experiments involving strong monoprotic acids and strong monoprotic bases • Describe the function and choice of indicators in titrations • Identify equivalence points on strong monoprotic acid–strong monoprotic base titration curves and differentiate between the indicator end point and the equivalence point.
Explain that scientific knowledge may lead to the development of new technologies, and new technologies may lead to or facilitate scientific discovery **Science, Technology and Society (STS)** (Science and Technology Emphasis)	• Describe how industries apply principles of stoichiometry to minimize waste and maximize yield

Unit D: Quantitative Relationships in Chemical Changes

Specific Outcomes	Achievement Indicators – Measurable outcomes
It is expected that students will:	*The following set of indicators may be used to assess student achievement for each related specific learning outcome. Students who have fully met the specific learning outcomes are able to:*
Explain how the appropriateness, risks and benefits of technologies need to be assessed for each potential application from a variety of perspectives, including sustainability	• Assess the significance of specific by-products from industrial, commercial and household chemical reactions • Analyze the use of technologies, such as smokestacks and catalytic converters, to reduce emissions that are harmful to the environment, such as SO_2 (g) and greenhouse gases.
SKILLS OUTCOMES: (embed throughout the unit)	
Initiating and Planning: Formulate questions about observed relationships; plan investigations of questions, ideas, problems and issues	• Design a procedure, using crystallization, filtration or titration, to determine the concentration of a solution • Describe procedures for the safe handling, storage and disposal of materials used in the laboratory, with reference to WHMIS and consumer product labelling information • Predict the approximate equivalence point for a strong monoprotic acid–strong monoprotic base titration and select an appropriate indicator.
Performing and Recording: Conduct investigations into relationships between and among observable variables and use a broad range of tools and techniques to gather and record data and information	• Perform a titration to determine the concentration of an acid or a base restricted to strong monoprotic acid–strong monoprotic base combinations • Use probes and software to collect titration data • Research methods used by industry to reduce emissions • Design a prototype of a chemical industrial plant
Analyzing and Interpreting: Analyze data and apply mathematical and conceptual models to develop and assess possible solutions	• Calculate theoretical and actual yield and percent yield and error, and account for discrepancies between the theoretical and actual yields • Analyze and evaluate experimental data of a precipitation reaction to determine the concentration of a solution • Graph and analyze titration curves for acid-base experiments restricted to strong monoprotic acid–strong monoprotic base combinations • Use appropriate SI notation, fundamental and derived units and significant digits when performing stoichiometric calculations
Communication and Teamwork: Work collaboratively in addressing problems and apply the skills and conventions of science in communicating information and ideas and in assessing results	• Standardize an acidic or a basic solution and compare group results