



SCIENCE DEPARTMENT

COURSE: Grade 12 University Chemistry

COURSE CODE: SCH4U0

OVERARCHING LEARNING GOALS

<p>Scientific Investigation and Skills and Career Exploration</p> <ul style="list-style-type: none"> Demonstrate scientific investigation skills in four areas: initiating and planning, performing and recording, analysing and interpreting and communicating. Identify and describe a variety of careers related to the fields of science under study, and identify scientists, including Canadians, who have made contributions to those fields. 	<p>Structure and Properties of Matter</p> <ul style="list-style-type: none"> Identify the scientists and experiments that led to the development of different models of the atom. Understand how bonding and intermolecular forces affect the properties of a substance. Investigate the societal and environmental impacts of products and technologies that apply principles of atomic structure and properties of matter.
<p>Organic Chemistry</p> <ul style="list-style-type: none"> Analyse and classify the different types of organic molecules. Identify organic reactions and predict their products. Understand how the structure of organic compounds affects physical and chemical properties. 	<p>Energy and Rates of Reaction</p> <ul style="list-style-type: none"> Understand the energy changes that occur during chemical reactions. Analyse and investigate factors that affect rates of reaction. Investigate technologies and chemical processes based on energy changes.
<p>Chemical Systems and Equilibrium</p> <ul style="list-style-type: none"> Understand the concept of dynamic equilibrium and its applications. Analyse variables that cause shifts in the equilibrium of systems qualitatively and quantitatively. 	<p>Electrochemistry</p> <ul style="list-style-type: none"> Identify oxidation and reduction reactions. Understand the practical applications of redox reactions.

SUCCESS CRITERIA

Structure and Properties of Matter

- I can describe the components of an atom and discuss the experimental evidence and theory that supports their existence, charge and location.
- I can describe the number and location of orbitals and electrons using quantum numbers, orbital diagrams and electron configurations.
- I can determine the geometric arrangement, shape, bond angles and polarity of a molecule by drawing a proper Lewis diagram and using VSEPR theory.
- I can determine the difference between atomic, molecular (both polar and non-polar), ionic, metallic and network solids, and predict their properties based on the structure's intermolecular forces.

Organic Chemistry

- I can provide the proper name, diagram, and chemical formula for a compound for different organic families.
- I can compare the structural differences of each of the organic families and predict their physical and chemical properties based on their structures.
- I can identify the structure of organic molecules that perform an organic reaction, explain the changes that occur, and predict the products of a reaction.

Energy and Rates of Reaction

- I can describe the law of conservation of energy and explain why enthalpy changes occur in physical changes and chemical reactions.
- I can calculate enthalpy change using a calorimeter, Hess' Law and enthalpies of formation.
- I can represent enthalpy changes using thermochemical equations and enthalpy diagrams.
- I can determine the rate of a reaction and describe the factors that affect reaction rate at the molecular level.
- I can determine a rate law and evaluate the reaction mechanism of a chemical reaction.

Chemical Systems and Equilibrium

- I can describe what equilibria are, the conditions that are required to create them and predict how to shift an equilibrium in a particular direction using Le Châtelier's Principle.
- I can calculate a variety of equilibrium constants including K_{eq} , K_a , K_b and K_{sp} , and solve related problems.
- I can describe strong and weak acids and bases using Arrhenius and Brønsted-Lowry theories, and calculate the $[H^{1+}]$, $[OH^{1-}]$, pH, and pOH of strong and weak acid and base solutions.
- I can determine if a salt is acidic, basic or neutral, and predict the pH of neutralization reactions at equivalence.
- I can explain what happens during acid-base titrations using titration curves, perform related calculations and choose an appropriate acid-base indicator.

Electrochemistry

- I can identify when a redox reaction occurs and describe the reaction using proper terminology, oxidation numbers and half reactions.
- I can write a balanced chemical equation for a redox reaction.
- I can describe how redox reactions are used in a variety of applications including the galvanic cell.

ASSESSMENT & EVALUATION

TERM EVALUATION – 70%

Assessment and evaluation in this course will be based on provincial curriculum expectations. Evaluation throughout the course and the final evaluation will incorporate four broad categories:

Knowledge and Understanding	Thinking/ Inquiry	Communication	Application
-knowledge of content -understanding of content	-planning and performing lab investigations -problem solving, critical thinking processes and skills	-expression and organization of ideas and information -use of conventions and terminology	-making connections to society, technology and the environment -transfer of knowledge and skills to unfamiliar contexts

Students will also receive descriptive feedback as part of the learning process which may not be assigned a mark. More detailed information regarding the Port Credit Secondary School Assessment and Evaluation policy can be found in the Student Agenda.

FINAL EVALUATION – 30%

The final evaluation will consist of an in-class, practical culminating task and/or a formal written exam.

LEARNING SKILLS

The following learning skills will be taught and assessed throughout the course and rated on the report card:

***Responsibility**

***Independent Work**

***Initiative**

***Organization**

***Collaboration**

***Self-regulation**

These skills will not be included in the final numeric mark. However, it is important to remember that the development of these skills is critical to academic achievement and does have a direct bearing on the final mark.