



Course Name: Chemistry, Grade 12	Course Code: SCH 4U	Course Pre-requisite: SCH 3U
Course Type: University Preparation	Grade Level: 12	Credit Value: 1
Textbook: Chemistry 12	Publisher: Nelson	Textbook Value: \$ 106.92
Teachers: K. Zuber		

Course Description:

This course enables students to deepen their understanding of chemistry through the study of organic chemistry, the structure and properties of matter, energy changes and rates of reaction, equilibrium in chemical systems, and electrochemistry. Students will further develop their problem-solving and investigation skills as they investigate chemical processes, and will refine their ability to communicate scientific information. Emphasis will be placed on the importance of chemistry in everyday life and on evaluating the impact of chemical technology on the environment.

Link 11-12 Science - http://www.edu.gov.on.ca/eng/curriculum/secondary/2009science11_12.pdf

Course Overall Expectations:

Strand	Overall Expectations
Scientific Investigation Skills and Career Exploration	As a component of every strand: <ul style="list-style-type: none">demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (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.
Organic Chemistry	<ul style="list-style-type: none">assess the social and environmental impact of organic compounds used in everyday life, and propose a course of action to reduce the use of compounds that are harmful to human health and the environment;investigate organic compounds and organic chemical reactions, and use various methods to represent the compounds;demonstrate an understanding of the structure, properties, and chemical behaviour of compounds within each class of organic compounds.
Structure and Properties of Matter	<ul style="list-style-type: none">assess the benefits to society and evaluate the environmental impact of products and technologies that apply principles related to the structure and properties of matter;investigate the molecular shapes and physical properties of various types of matter;demonstrate an understanding of atomic structure and chemical bonding, and how they relate to the physical properties of ionic, molecular, covalent network, and metallic substances
Energy Changes and Rates of Reactions	<ul style="list-style-type: none">analyse technologies and chemical processes that are based on energy changes, and evaluate them in terms of their efficiency and their effects on the environment;investigate and analyse energy changes and rates of reaction in physical and chemical processes, and solve related problems;demonstrate an understanding of energy changes and rates of reaction.
Chemical Systems and Equilibrium	<ul style="list-style-type: none">analyse chemical equilibrium processes, and assess their impact on biological, biochemical, and technological systems;investigate the qualitative and quantitative nature of chemical systems at equilibrium, and solve related problems;demonstrate an understanding of the concept of dynamic equilibrium and the variables that cause shifts in the equilibrium of chemical systems.
Electrochemistry	<ul style="list-style-type: none">analyse technologies and processes relating to electrochemistry, and their implications for society, health and safety, and the environment;investigate oxidation-reduction reactions using a galvanic cell, and analyse electrochemical reactions in qualitative and quantitative terms;demonstrate an understanding of the principles of oxidation-reduction reactions and the many practical applications of electrochemistry.

Assessment and Evaluation Strategies:

The purpose of assessment and evaluation is to improve student learning. Assessment and evaluation is based on the provincial curriculum expectations and the achievement levels outlined in the curriculum document. In order to ensure that assessment and evaluation are valid and reliable, and that they lead to the improvement of student learning, teachers use a variety of strategies throughout the course, including: providing students with feedback about their work (known as assessment for learning), helping to set learning goals and monitor their own progress (known as assessment as learning), and evaluation and reporting of progress in the form of grades and marks (known as assessment of learning).

Unit Overview Students will work with related scientific investigation skills and explore scientific careers as part of each unit.	Assessment and Evaluation Methods (May include major evaluations)
Organic Chemistry Topics <ul style="list-style-type: none"> properties, models, naming, chemical and structural formulae of classes of organic compounds; organic chemical reactions; structure and properties of organic isomers; impact of organic compounds on human health, society and the environment; actions to reduce use of harmful compounds that are harmful to human 	<ul style="list-style-type: none"> assignments, debates, group work, laboratory investigations, presentations, projects, quizzes, reports and tests
Structure and Properties of Matter Topics <ul style="list-style-type: none"> observations and inferences made by Rutherford and Bohr; electron configurations; quantum atomic theory; Pauli exclusion principle, Hund's rule, and the aufbau principle; characteristic properties of elements in each of the periodic table blocks; periodic trends in properties and electron configuration; physical properties according to bond type; molecular shape and polarity; impact of intermolecular and intramolecular forces on physical properties of solids/liquids; prediction of types of solids based on structure and properties; Canadian contributions to atomic and molecular theory and impacts of materials/technologies that are based on the principles of atomic/molecular structures and bonding 	<ul style="list-style-type: none"> assignments, debates, exam, group work, laboratory investigations, presentations, projects, quizzes, reports and tests
Energy Changes and Rates of Reactions Topics <ul style="list-style-type: none"> energy changes of physical changes, chemical reactions and nuclear reactions; energy changes associated with bond formation/breaking; factors affecting amount of heat gained or lost by the substance; analysis of heat transfer; thermochemical equations; Hess's law; collision theory and potential energy diagrams; factors affecting chemical reaction rates; reaction mechanisms; conventional and alternative energy technologies; and methods to maximize efficiency of natural/industrial chemical reactions and impact on environmental sustainability 	<ul style="list-style-type: none"> assignments, debates, exam, group work, laboratory investigations, presentations, projects, quizzes, reports and tests
Chemical Systems and Equilibrium Topics <ul style="list-style-type: none"> dynamic equilibrium; physical and chemical equilibrium systems; application of Le Châtelier's principle; common equilibrium constants and their expressions; the ionization constant of water and calculations of pH/pOH, hydronium/hydroxide concentration; Brønsted-Lowry theory of acids and bases; properties of strong/weak acids/bases; acid-base equilibrium and titration; chemical characteristics of buffer solutions; application of equilibrium principals to maintain optimal conditions for an industrial or natural chemical process; and impacts of chemical equilibrium processes on various biological, biochemical, and technological systems 	<ul style="list-style-type: none"> assignments, debates, group work, laboratory investigations, presentations, projects, quizzes, reports and tests
Electrochemistry Topics <ul style="list-style-type: none"> redox reactions; components and functioning of a galvanic cell; half-cell reactions; balancing redox reactions using oxidation numbers of atoms and half-reactions; cell potentials; redox reaction spontaneity; applications of electrochemistry in common industrial processes; metal corrosion and corrosion-inhibiting techniques; viability of using electrochemical technologies as alternative sources of energy; and health and safety issues involving electrochemistry 	<ul style="list-style-type: none"> assignments, debates, group work, laboratory investigations, presentations, projects, quizzes, reports and tests
Course Culminating Activity/Independent Study <ul style="list-style-type: none"> Molecule Structure/Analysis and Construction Organic Chemistry Project/Analysis Redox Titration/Performance Task 	<ul style="list-style-type: none"> at the conclusion of all the required strands
Exam	<ul style="list-style-type: none"> written exam in January

Assessment and Evaluation Categories and Weights:

Achievement Chart Categories	
Term Achievement Category	Comprises
Application/Making Connections	<ul style="list-style-type: none"> ● transfer of concepts between self and science ● transfer of concepts between science and other subjects ● transfer of concepts between subjects and the world outside ● access impacts of science
Communication	<ul style="list-style-type: none"> ● oral, writing, listening and visual skills ● mathematical/data communication, presentation and precision/accuracy ● journals, portfolios and models
Knowledge/Understanding	<ul style="list-style-type: none"> ● facts, terms and relationships between concepts ● transfer of concepts to new contexts ● solving math/formula problems
Thinking/Inquiry	<ul style="list-style-type: none"> ● design skills (formulate hypotheses, create and test procedures) ● thinking skills (inductive reasoning, deductive reasoning and data analysis, interpretation and evaluation)

Evaluation/Weight of Marks			
Evaluation	Components	Component Percentage	Overall Percentage
Term Evaluation	Application/Making Connections	25	70
	Communication	25	
	Knowledge/Understanding	25	
	Thinking/Inquiry	25	
Final Evaluation	Culminating Activity	10	30
	Exam	20	

Learning Skills and Work Habits Assessment:

The development of learning skills and work habits is an integral part of student learning. These skills are:

- Responsibility
- Organization
- Independent Work
- Collaboration
- Initiative
- Self-Regulation

Learning skills and work habits influence student achievement and are included as a formal part of the assessment and evaluation process. Learning skills and work habits will be assessed through a variety of teacher strategies. (e.g. observation, student /teacher conference, self-reflection, checklists, exit cards, etc.) These important learning skills and work habits will be formally reported on the Provincial Report Card according to the following scale: E- Excellent, G- Good, S- Satisfactory, N- Needs Improvement.

Academic Dishonesty - Cheating and Plagiarism:

Learning tasks that students complete as well as the assignments, tests and exams that students submit for evaluation must be their own work. Cheating and plagiarism is a serious offence that will not be condoned. Academic consequences will result.

Late and Missed Assignments - Student Roles and Responsibilities - Students are expected to:

- be responsible for providing evidence of their achievement of the overall expectations within the time frame specified by the teacher, and in a form approved by the teacher;
- understand that there will be consequences for not completing assignments for evaluation and/or for submitting those assignments late;
- use class time productively;
- in extenuating circumstances, request an extension from the teacher before the due date.

Mark deductions for late and missed assignments may apply to **major assignments only**.

References: *TVDSB Assessment & Evaluation Policy, September 2011; Growing Success - Assessment and Evaluation, and Reporting in Ontario Schools, 2010. Student Planner and School Web site*