SCH4U – Chemistry, Grade 12

GENERAL INFORMATION

Name of School: Rosedale Academy
Department: Science
Course Developer: Eli Fogle
Development Date: October 2014
Revision Date: June, 2017
Course Title: Chemistry, Grade 12
Grade: 12
Course Type: University Preparation
Course Code: SCH4U
Credit Value: 1
Curriculum Policy Document: The Ontario Curriculum Grades 11 and 12 Science, Ministry of Education 2008 (Revised)

Prerequisite: SCH3U

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.

OVERALL EXPECTATIONS

A. SCIENTIFIC INVESTIGATION SKILLS AND CAREER EXPLORATION
Throughout this course, students will:
A1. 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)
A2. identify and describe careers related to the fields of science under study, and describe the contributions of scientists, including Canadians, to those fields.

B. ORGANIC CHEMISTRY
By the end of this course, students will:
B1. 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;
B2. Investigate organic compounds and organic chemical reactions, and use various methods to represent the compounds;
B3. demonstrate an understanding of the structure, properties, and chemical behaviour of compounds within each class of organic compounds.

C. STRUCTURE AND PROPERTIES OF MATTER
By the end of this course, students will:
C1. 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;
C2. investigate the molecular shapes and physical properties of various types of matter;
C3. 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.

D. ENERGY CHANGE AND RATE OF REACTION
By the end of this course, students will:
D1. analyze technologies and chemical processes that are based on energy changes, and evaluate them in terms of their efficiency and their effects on the environment;
D2. investigate and analyze energy changes and rates of reaction in physical and chemical processes, and solve related problems;
D3. demonstrate an understanding of energy changes and rates of reaction.

E. CHEMICAL SYSTEMS AND EQUILIBRIUM
By the end of this course, students will:
E1. analyze chemical equilibrium processes, and assess their impact on biological, biochemical, and technological systems;
E2. investigate the qualitative and quantitative nature of chemical systems at equilibrium, and solve related problems
E3. demonstrate an understanding of the concept of dynamic equilibrium and the variables that cause shifts in the equilibrium of chemical systems.

F. ELECTROCHEMISTRY
F1. analyse technologies and processes relating to electrochemistry, and their implications for society, health and safety, and the environment;
F2. investigate oxidation-reduction reactions using a galvanic cell, and analyse electrochemical reactions in qualitative and quantitative terms;
F3. demonstrate an understanding of the principles of oxidation-reduction reactions and the many practical applications of electrochemistry.

OUTLINE OF COURSE CONTENT

	Name of Unit	Time Allocated in Hours
Unit 1	Structure & Properties of Matter	24
Unit 2	Organic Chemistry	22
Midterm report cards		
Unit 3	Energy Change & Rates of Reaction	23
Unit 4	Chemical Systems & Equilibrium	22
Unit 5	Electrochemistry	19
	Total	**110 hours**

TEACHING / LEARNING STRATEGIES

A variety of teaching and learning strategies are used in this course to meet the needs of a diverse range of learners.

- Demonstrations
- Simulations
- Laboratory Activities
- Problem Solving
- Work Sheets
- Problem-Based Learning
- Interactive modules
- Inquiry Based Learning
- Experiments
- Audio Presentations
- Video Presentations
- Interactive Online Activities
- Guided Internet Searches
- Case Studies
- Graphic Organizers
- Brainstorming/Mind Mapping
- Research Projects
- Articulate activities

STRATEGIES FOR ASSESSMENT AND EVALUATION OF STUDENT PERFORMANCE

Assessment as Learning	Assessment for Learning	Assessment of Learning
Student Product • Learning Logs • Peer Assessment • Discussion Forum Posts • Surveys	**Student Product** • Assignments • Quizzes • Practice Problem Work Sheets • Simulator Investigations • Lab Investigations • Forum Posts • Audio presentations • Video Presentations	**Student Product** • Assignments • Tests • Exams • Lab Reports • Audio Presentations • Video Presentations • Case studies • Research Projects
Observation • Class discussions • Discussion Forums • Quiz results	**Observation** • Class discussions • Presentations	**Observation** • Presentations • Performance tasks

Conversation	Conversation	Conversation
• Whole class discussions • Student-Teacher discussions (skype, chat) • Student-Student discussions • Debate (Forums)	• Student teacher conferences • Small group discussions • Whole class discussions • Peer-feedback • Forums	• Oral Presentations • Student-Teacher discussions • Forums

FINAL GRADE

The percentage grade represents the quality of the students' overall achievement of the expectations for the course and reflects the corresponding achievement as described in the achievement chart for science.

1. Term work will be 70% of the overall grade for the course;
2. The final written exam will be worth 30% of the grade.

Achievement Categories

Knowledge & Understanding	25%	Thinking & Investigation	25%
Communication	25%	Application	25%

Achievement Chart

A Summary Description of Achievement in Each Percentage Grade Range And Corresponding Level of Achievement

Percentage Grade Range	Achievement Level	Summary Description
80–100%	Level 4	A very high to outstanding level of achievement. Achievement is above the provincial standard.
70–79%	Level 3	A high level of achievement. Achievement is at the provincial standard.
60–69%	Level 2	Moderate level of achievement. Achievement is below, but approaching the provincial standard.
50–59%	Level 1	A passable level of achievement. Achievement is below the provincial standard

Below 50%	Level R	Insufficient achievement of curriculum expectations. A credit will not be granted

RESOURCES REQUIRED BY THE STUDENT

SCH4U Online Course of Study

PROGRAM PLANNING CONSIDERATION

Role of Technology in the Curriculum

Rosedale Academy courses leverage the power of information and communication technologies to provide rich, dynamic learning experiences. Students explore, evaluate and create concepts and works using a wide array of digital tools. They demonstrate their learning through text, video, voice and visual assignments that teach multi-literacy and media skills. Students also enhance their computer and technology skills in ways that are useful for their future academic and personal pursuits.

Teachers at Rosedale Academy get to know their learners, provide rich, descriptive feedback and assess student contributions and products AS, FOR and OF learning through digital technologies. They enable rapid feedback and communication at any time without borders in our global community.

Tool	Use	Benefit
Discussion forums	Whole class discussion (written)	Creates a record of each student's contributions.
Group activities	Small group collaboration and discussions.	Encourages student participation.
Live Skype sessions	Teacher leads the lesson with students as a class. Teacher holds reviews sessions with whole class or individuals.	Observations of whole class and individual students. Assessment for learning.
Computer Simulations	Individual or class exploration and visualization of concepts relating to the curriculum.	Allows hands-on exploration and investigation as an alternative learning strategy.
Online Lab Investigations	Application of concepts relating to the curriculum.	Allows students to experience laboratory environment in an online setting and apply proper laboratory techniques.
Learning Modules	Students explore content in an interactive manner with built-in assessments as they progress.	Students can navigate content at their own pace and assess their own learning along the way.
Articulate	Content is presented in an	Varied presentation style caters to

Storyline Presentations	interactive manner with multimedia elements and assessments built-in.	different types of learners. Students can assess their own learning as they progress.
Glossary	Vocabulary reference and recording.	Allows students to reference key course vocabulary.

English as a Second Language

Rosedale Academy provides students with comprehensive ESL support to enhance their proficiency with the English language.

- All Rosedale Academy instructional materials and resources are designed with English Language Learners in mind. Online and face-to-face instructional resources make use of differentiated learning methods and carefully structured language. These resources support English language development as students are taking credit courses in all academic fields.
- Teachers at Rosedale Academy provide a variety of accommodations for English Language Learners. These accommodations include: extended time for tests and exams; chunking of assignments and tests; a safe space for asking questions; formative feedback; mini-lessons in spelling, sentence structure and grammar; and access to ESL resources and expert discussion.
- The self-paced delivery method of this course allows students to take the time that they require to engage in meaningful participation while still enjoying the enriching experience of working in an online global classroom.
- All teachers at Rosedale Academy are responsible for helping students to develop their ability to use English in academic courses.

Career Education

This course promotes skills effective for a variety of careers and informs students of some of the career opportunities where oral and written communication is considerable assets. Students will learn how to use English to inform audiences about ideas, persuade audiences to change their opinion or buy a product, and to formulate ideas. Students will also understand the importance of social media in their search for future education and career opportunities. Finally, this course also helps to prepare students for university application by providing a unit that helps them write a persuasive application essay. Beyond the immediate needs of the student, this also course focuses on demonstrating the value of English in jobs like business where clear communication is highly valued.

Academic Integrity

Students are expected to maintain high standards of honesty and academic integrity throughout their participation in all courses. This includes avoiding any instance of fraud, plagiarism and cheating. Rosedale Academy takes the following steps to ensure academic integrity:

- Students provide photo identification
- Course assignments include audio and video components
- Teachers Skype weekly with their classes
- Students are encouraged and supported to develop original work
- Exams are proctored by adults in trusted positions

When a teacher has reasonable grounds to believe that a student has violated these standards, the school principal will review the incident and, if needed, enforce disciplinary procedures. More information about *Academic Honesty* may be found in section 5.3 of the school calendar.

Late and Missed Assignment

Rosedale Academy provides a flexible, self-paced learning opportunity, which allows students to proceed through each course at their own speed. Students may submit any assignment from any unit while he or she is enrolled in this course. Assignments will not be accepted once the student's enrolment period has ended. Students must complete and submit all course requirements prior to booking their final exam. Course requirements include but are not limited to: assignments, tests, and learning log.