



NIAGARA ACADEMY
CHEMISTRY, GRADE 11, UNIVERSITY PREPARATION
COURSE OUTLINE

COURSE CODE: SCH3U

DEVELOPED BY: V. Rows, September, 2002

REVISED BY: V. Rows, 2009, L. Cousineau, 2012, 2013, M. Wilson, 2014, J. Zelic, 2016, J. Aparicio, 2018

DEVELOPED FROM: The Ontario Curriculum Grades 11 and 12, Science, 2008, http://www.edu.gov.on.ca/eng/curriculum/secondary/2009science11_12.pdf

PREREQUISITE: Grade 10 Science, Academic

COURSE DURATION: 110 hours

COURSE VALUE: 1.0 credits

COURSE TEXT: Nelson Chemistry 11, Thomson Nelson, 2002

COURSE DESCRIPTION AND RATIONALE

This course enables students to deepen their understanding of chemistry through the study of the properties of chemicals and chemical bonds; chemical reactions and quantitative relationships in those reactions; solutions and solubility; and atmospheric chemistry and the behaviour of gases. Students will further develop their analytical skills and investigate the qualitative and quantitative properties of matter, as well as the impact of some common chemical reactions on society and the environment.

OVERALL CURRICULUM EXPECTATIONS

A. Scientific Investigation Skills and Career Exploration: By the end of 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 a variety of careers related to the fields of science under study, and identify scientists, including Canadians, who have made contributions to those fields.
B. Matter, Chemical Trends, and Chemical Bonding: By the end of this course, students will:	
B1.	analyse the properties of commonly used chemical substances and their effects on human health and the environment, and propose ways to lessen their impact;
B2.	investigate physical and chemical properties of elements and compounds, and use various methods to visually represent them;
B3.	demonstrate an understanding of periodic trends in the periodic table and how elements combine to form chemical bonds.
C. Chemical Reactions: By the end of this course, students will:	
C1.	analyse chemical reactions used in a variety of applications, and assess their impact on society and the environment;
C2.	investigate different types of chemical reactions;
C3.	demonstrate an understanding of the different types of chemical reactions.
D. Quantities in Chemical Reactions: By the end of this course, students will:	
D1.	analyse processes in the home, the workplace, and the environmental sector that use chemical quantities and calculations, and assess the importance of quantitative accuracy in industrial chemical processes;
D2.	investigate quantitative relationships in chemical reactions, and solve related problems;
D3.	demonstrate an understanding of the mole concept and its significance to the quantitative analysis of chemical reactions.
E. Solutions and Solubility:	
E1.	analyse the origins and effects of water pollution, and a variety of economic, social, and environmental issues related to drinking water;
E2.	investigate qualitative and quantitative properties of solutions, and solve related problems;
E3.	demonstrate an understanding of qualitative and quantitative properties of solutions.
F. Gases and Atmospheric Chemistry:	
F1.	analyse the cumulative effects of human activities and technologies on air quality, and describe some Canadian initiatives to reduce air pollution, including ways to reduce their own carbon footprint;
F2.	investigate gas laws that explain the behaviour of gases, and solve related problems;
F3.	demonstrate an understanding of the laws that explain the behaviour of gases.

COURSE CONTENT AND EVALUATION

Evaluation in each unit will include Knowledge/Understanding - 25%, Thinking - 25%, Communication - 25%, Application - 25%. Examples of term work to be assessed are notebooks, lab activities, reflections/journals, presentations, case studies, discussions, research/graphing/model creating/investigative assignments, reports, performance tasks, quizzes, unit tests. **Strand A, Scientific Investigation Skills and Career Exploration** will be included and evaluated in each unit.

Unit	Description	Evaluation	Hours
Unit One	Matter and Chemical Bonding: 1. The nature of matter 2. The Periodic Table 3. Chemical bonding	14%	22
Unit Two	Chemical Reactions: 1. Types of Reactions 2. Balancing Chemical Equations 3. Predicting products	14%	22
Unit Three	Quantities in Chemical Reactions: 1. The Mole 2. Quantities in chemical formulas 3. Quantities in chemical equations	14%	22
Unit Four	Solutions and Solubility: 1. Characteristics of solutions 2. Quantities in solutions 3. Acids and bases	14%	22
Unit Five	Gases and Atmospheric Chemistry: 1. Properties and behaviour of gases 2. Gas laws 3. Gas mixtures and reactions	14%	22
	Total Term Work	70%	110 hrs
Final Evaluation	Culminating Activity	10%	
	Final Exam	20%	
	Final Mark	100%	

TEACHING AND LEARNING STRATEGIES

Effective instructional approaches and learning activities draw on students' prior knowledge, capture their interest, and encourage meaningful practice both inside and outside the classroom. Students will be engaged when they are able to see the connection between the scientific concepts they are learning and their application in the world around them and in real-life situations. The following are specific strategies for teaching and learning.

- Assessment of prior knowledge and provision of differentiated instruction for individual students
- Teaching and modelling of learning strategies
- Problem posing and problem solving

- Individual and cooperative small group learning, teamwork
- Hands-on experiments
- Brainstorming
- Creation of scenarios for decision making
- Independent research
- Issue-based analysis
- Personal reflection
- Seminar presentations
- Use of technology
- Hands-on applications
- Constructive or creative dialogue

ASSESSMENT AND EVALUATION

Evaluation and Reporting of Student Achievement: Student achievement is communicated formally to students and parents by means of the Provincial Report Card, Grades 9–12. The report card provides a record of the student’s achievement of the curriculum expectations in every course, at particular points in the school year or semester, in the form of a percentage grade. The percentage grade represents the quality of the student’s overall achievement of the expectations for the course which are described in the achievement chart on pages 26-27 of The Ontario Curriculum Grades 11 and 12, Science, 2008, Website: http://www.edu.gov.on.ca/eng/curriculum/secondary/2009science11_12.pdf

Learning Skills will also be assessed and reported on the Provincial Report Card, Grades 9-12. The quality of the learning skills demonstrated by a student are recorded in six categories – Responsibility, Organization, Independent Work, Collaboration, Initiative, Self-Regulation – are assessed throughout the semester using a four-point scale (E - Excellent, G - Good, S - Satisfactory, N - Needs Improvement), and the document page 11, Growing Success: Assessment, Evaluation and Reporting in Ontario Schools, 2010, as a guide (<http://www.edu.gov.on.ca/eng/policyfunding/growSuccess.pdf>).

Assessment for Learning will be used as a process for seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go, and how best to get there. Teachers will use diagnostic assessment before instruction and formative assessment will occur frequently and in an ongoing manner to monitor students’ progress. Observation and conversation will be used to determine the needs of individual student learning.

Assessment as Learning will focus on the explicit fostering of student’s capacity over time to be their own best assessors, but teachers need to start by presenting and modelling external, structured opportunities for students to assess themselves. Formative assessment be used by students to monitor their own and their peers’ progress.

Assessment of Learning will be used as the assessment that becomes public and results in statements or symbols about how well students are learning. Summative assessment will be used by the teacher to summarize learning at a given point in time. (Ref: page 31 of Growing Success)

A student's achievement of the overall curriculum expectations will be evaluated in accordance with the achievement charts in the provincial curriculum and will be reported using percentage marks. It is expected that both mathematical calculations and professional judgement will inform the determination of percentage marks

The teacher will use assessment strategies that:

- are fair, transparent and equitable for all students;
- are clearly communicated to students at the beginning of the course and at other points throughout the semester
- are varied in nature, administered over a period of time and designed to provide opportunities for students to demonstrate the full range of their learning
- are appropriate for the learning activities used, the purposes of instruction and the needs and experiences of the students
- relate to the curriculum expectations and learning goals and, as much as possible, to the interests, learning styles and preferences, needs and experiences of all students
- accommodate students with special education needs, consistent with the strategies outlined in their Individual Education Plan
- accommodate the needs of students who are learning the language of instruction
- ensure that each student is given clear directions for improvement
- promote students' ability to assess their own learning and to set specific goals
- ensure that each student is given clear directions for improvement

A final grade is recorded for every course, and a credit is granted and recorded for every course in which the student's grade is 50% or higher. The final grade for each course in Grades 9–12 will be determined as follows:

- Seventy per cent of the grade will be based on evaluations conducted throughout the course. This portion of the grade should reflect the student's most consistent level of achievement throughout the course, although special consideration should be given to more recent evidence of achievement. Please see the chart below for an explanation of how course work marks will be obtained.
- Thirty per cent of the grade will be based on a final evaluation in the form of an examination, performance, essay, and/or other method of evaluation suitable to the course content and administered towards the end of the course. This final evaluation consists of the following: Culminating Activity 10% and Final Exam 20%.

CONSIDERATIONS FOR PROGRAM PLANNING

The planning and administering of this course is based on the premise that all students can be successful language learners. The teacher will provide quality instruction that respects students' strengths and address their learning needs, using assessment information to plan instruction.

Teachers of science will incorporate appropriate strategies for instruction and assessment to facilitate the success of the ELL students in their classrooms. These strategies include:

- modification of some or all of the course expectations, based on the student's level of English proficiency;
- use of a variety of instructional strategies (e.g. extensive use of visual cues, manipulatives, pictures, diagrams, graphic organizers; attention to clarity of instructions; modelling of preferred ways of working in mathematics; previewing of textbooks; pre-teaching of key specialized vocabulary; encouragement of peer tutoring and class discussion; strategic use of students' first languages);
- use of a variety of learning resources (e.g., visual material, simplified text, bilingual dictionaries, culturally diverse materials);
- use of assessment accommodations (e.g., granting of extra time; use of alternative forms of assessment, such as oral interviews, learning logs, or portfolios; simplification of language used in problems and instructions).

Information and communications technology will be used throughout the course where it is appropriate. The program will also include opportunities for students to apply their skills to work-related situations, to explore educational and career options, and to become self-directed learners.

Teachers will model safe practices at all time and communicate safety requirements to students in accordance with the school, the Ministry of Education policies and Ministry of Labour regulations. This is particularly important in the case of off-site excursions. Teachers will also adhere to the policies of the First Nation, Métis and Inuit Education policy framework should the class include students from these communities.

RESOURCES

Nelson Chemistry 11, Thomson Nelson, 2002