INUKSHUK ACADEMY

Course code: **Chemistry (SCH4U)**
Total Hours: **110 hours** and Credit: **1.0**
Prerequisite: **Chemistry (SCH3U)**
Curriculum basis: **Ontario Curriculum, Grades 11–12: Science (Revised 2008)**
Last Update: **Inukshuk Academy 2026**

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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.

1. Course Rationale

Chemistry provides the conceptual framework for understanding matter, energy, and the transformations that govern natural and technological systems. SCH4U strengthens students' ability to analyze chemical processes, interpret quantitative relationships, and apply scientific reasoning to complex real-world problems. Through inquiry, experimentation, modelling, and analytical problem solving, students:

- Develop a deeper understanding of organic chemistry, atomic structure, thermochemistry, electrochemistry, kinetics, and chemical equilibrium;
- Explore how chemical structure influences properties, reactivity, and behaviour of substances;
- Refine laboratory, mathematical, and analytical skills essential for university-level science and STEM disciplines;
- Learn to interpret chemical data, evaluate scientific evidence, and communicate scientific reasoning clearly;
- Recognize the impact of chemistry on health, industry, environmental sustainability, technology, and society.

The course fosters scientific literacy, critical thinking, quantitative reasoning, and problem-solving skills essential for success in university programs and careers in chemistry, engineering, medicine, environmental science, biotechnology, pharmacology, and related scientific fields.

2. Overall Curriculum Expectations

The Ontario Curriculum organizes SCH4U into five major strands. The following expectations are paraphrased for clarity and alignment with Inukshuk Academy's course design.

a. Scientific Investigation Skills and Career Exploration

Students will:

- Demonstrate advanced scientific investigation skills related to inquiry, experimentation, laboratory safety, data analysis, and communication;
- Analyze chemical data using appropriate scientific methods, calculations, graphing techniques, and laboratory procedures;

- Evaluate scientific evidence and communicate conclusions using proper chemical terminology, equations, units, and conventions;
- Explore careers related to chemistry, engineering, medicine, environmental science, biotechnology, pharmacology, and scientific research.

b. Organic Chemistry

Students will:

- Analyze the structure, properties, and reactions of organic compounds;
- Classify and name organic molecules using IUPAC nomenclature;
- Investigate synthesis, substitution, elimination, addition, and oxidation-reduction reactions in organic chemistry;
- Evaluate applications of organic chemistry in medicine, materials science, biotechnology, and environmental science.

c. Structure and Properties of Matter

Students will:

- Investigate atomic structure, quantum theory, electron configuration, and bonding models;
- Analyze periodic trends, intermolecular forces, molecular geometry, and polarity;
- Demonstrate an understanding of how molecular structure influences chemical and physical properties;
- Evaluate the applications of bonding theories and material properties in scientific and industrial contexts.

d. Energy Changes and Electrochemistry

Students will:

- Analyze thermochemical processes and energy changes in chemical reactions;
- Investigate calorimetry, enthalpy, Hess's law, and thermochemical equations;
- Examine oxidation-reduction reactions and electrochemical systems;
- Evaluate the applications of electrochemistry in batteries, corrosion prevention, fuel cells, and industrial processes.

e. Chemical Kinetics and Equilibrium

Students will:

- Investigate factors affecting reaction rates and dynamic equilibrium systems;
- Analyze collision theory, reaction mechanisms, and rate laws;
- Solve equilibrium problems using equilibrium constants and quantitative reasoning;
- Evaluate industrial, biological, and environmental applications of equilibrium and kinetics.

3. Learning Goals for Students

By the end of SCH4U, students will be able to:

- Analyze chemical systems using scientific inquiry, modelling, and evidence-based reasoning;
- Conduct laboratory investigations using proper safety procedures, experimental design, observation, measurement, and data analysis;
- Explain concepts related to organic chemistry, bonding theory, thermochemistry, electrochemistry, kinetics, and equilibrium;
- Interpret chemical data using equations, molecular models, graphs, calculations, and scientific terminology;
- Evaluate the impact of chemistry and chemical technologies on health, society, industry, sustainability, and the environment;
- Communicate scientific reasoning clearly using appropriate chemical vocabulary, balanced equations, diagrams, laboratory reports, and research formats.

Course Structure and Instructional Units

Unit	Description	Hours
Unit 0: Laboratory Skills and Scientific Inquiry	Lab safety, measurement, uncertainty, scientific notation, graphing, data analysis, laboratory communication	5 hours
Unit 1: Organic Chemistry	Organic structures, nomenclature, functional groups, reaction types, mechanisms, polymers, applications	22 hours
Unit 2: Structure and Properties of Matter	Quantum theory, electron configuration, bonding, molecular geometry, intermolecular forces, material properties	18 hours
Unit 3: Energy Changes and Thermochemistry	Enthalpy, calorimetry, Hess's law, thermochemical equations, energy applications	18 hours
Unit 4: Electrochemistry	Oxidation-reduction reactions, galvanic and electrolytic cells, cell potentials, corrosion, fuel cells	14 hours
Unit 5: Chemical Kinetics and Equilibrium	Reaction rates, collision theory, rate laws, equilibrium systems, Le Châtelier's principle, equilibrium calculations	21 hours
Culminating Task	Chemical investigation, inquiry assignment, or applied chemistry project	5 hours
Final Exam	Proctored examination	2 hours

4. Course Structure, Unit Overview and Instructional Plan

1. Unit 0: Laboratory Skills and Scientific Inquiry

Approx. Hours: 5

a. Unit Overview

This introductory unit strengthens students' scientific investigation and laboratory skills required for success in SCH4U. Students refine techniques involving precision measurement, uncertainty, graphing, data analysis, laboratory safety, and scientific communication. Emphasis is placed on experimental accuracy, proper use of laboratory equipment, and interpretation of quantitative data.

b. Key Learning Goals

Students will:

- Demonstrate safe and responsible laboratory practices;
- Apply scientific notation, significant digits, and unit conversions accurately;
- Analyze experimental error, uncertainty, and reliability of results;
- Organize and interpret laboratory data using tables and graphs;
- Communicate scientific findings clearly using proper scientific conventions.

c. Sample Learning and Assessment Activities

- Laboratory safety investigations and WHMIS review;
- Precision measurement and uncertainty activities;
- Graphing and data-analysis investigations;
- Scientific communication and lab-report practice;
- Diagnostic quizzes, mini-lab reports, graphing assignments.

2. Unit 1: Organic Chemistry

Approx. Hours: 22

a. Unit Overview

Students investigate the structure, classification, properties, and reactions of organic compounds. The unit emphasizes the relationship between molecular structure and chemical behaviour while exploring functional groups, isomerism, reaction mechanisms, and polymer chemistry. Students apply nomenclature rules, predict reaction products, and examine applications of organic chemistry in medicine, biotechnology, environmental science, and industry.

b. Key Learning Goals

Students will:

- Classify and name organic compounds using IUPAC conventions;
- Analyze structural formulas, isomerism, and functional groups;
- Predict products of organic reactions;
- Investigate synthesis, substitution, addition, elimination, and oxidation-reduction reactions;
- Evaluate applications of polymers and organic compounds in real-world contexts.

c. Sample Learning and Assessment Activities

- Molecular modelling investigations;
- Organic nomenclature and reaction practice;
- Polymer and pharmaceutical case studies;
- Laboratory investigations of organic compound properties;
- Reaction mechanism assignments, quizzes, unit test.

3. Unit 2: Structure and Properties of Matter

Approx. Hours: 18

a. Unit Overview

Students investigate atomic theory, bonding models, molecular geometry, and intermolecular forces. The unit focuses on how microscopic structure influences macroscopic properties such as conductivity, polarity, boiling point, solubility, and reactivity. Students apply quantum theory, VSEPR theory, and bonding concepts to explain material behaviour and chemical properties.

b. Key Learning Goals

Students will:

- Interpret electron configurations and quantum models;
- Analyze periodic trends and bonding behaviour;
- Predict molecular geometry and polarity using VSEPR theory;
- Relate intermolecular forces to physical and chemical properties;
- Evaluate structure-property relationships in materials and compounds.

c. Sample Learning and Assessment Activities

- Molecular geometry and bonding investigations;
- Electron configuration and periodic trend analysis;
- Solubility and conductivity experiments;
- Intermolecular force modelling activities;

- Bonding assignments, lab investigations, quizzes, unit test.

4. Unit 3: Energy Changes and Thermochemistry

Approx. Hours: 18

a. Unit Overview

Students investigate energy transfer during chemical reactions through calorimetry, enthalpy, Hess's law, and thermochemical equations. Emphasis is placed on quantitative analysis, laboratory investigation, and interpretation of energy changes in chemical and environmental systems.

b. Key Learning Goals

Students will:

- Distinguish between endothermic and exothermic reactions;
- Calculate enthalpy changes using calorimetry and Hess's law;
- Interpret thermochemical equations and energy diagrams;
- Analyze efficiency and environmental implications of energy technologies;
- Apply thermochemical concepts to scientific and industrial processes.

c. Sample Learning and Assessment Activities

- Calorimetry laboratory investigations;
- Hess's law modelling activities;
- Energy efficiency and fuel analysis case studies;
- Thermochemical calculation problem sets;
- Laboratory reports, quizzes, unit test.

5. Unit 4: Electrochemistry

Approx. Hours: 14

a. Unit Overview

Students investigate oxidation-reduction reactions, electrochemical cells, and practical applications of electrochemistry. Topics include balancing redox equations, galvanic and electrolytic cells, corrosion, electroplating, and fuel cell technology.

b. Key Learning Goals

Students will:

- Identify oxidation and reduction processes using oxidation numbers;
- Balance redox equations in acidic and basic solutions;

- Analyze galvanic and electrolytic cells;
- Calculate and interpret cell potentials;
- Evaluate applications of electrochemistry in technology and industry.

c. Sample Learning and Assessment Activities

- Construction and analysis of voltaic cells;
- Electrolysis simulations and investigations;
- Corrosion prevention case studies;
- Redox balancing workshops;
- Electrochemistry assignments, lab reports, quizzes, unit test.

6. Unit 5: Chemical Kinetics and Equilibrium

Approx. Hours: 21

a. Unit Overview

Students investigate reaction rates, collision theory, dynamic equilibrium, and equilibrium calculations. The unit emphasizes quantitative analysis, experimental investigation, and interpretation of equilibrium systems in industrial, environmental, and biological contexts.

b. Key Learning Goals

Students will:

- Analyze factors affecting reaction rates;
- Interpret rate laws and collision theory;
- Solve equilibrium problems using equilibrium constants;
- Apply Le Châtelier's principle to predict equilibrium shifts;
- Evaluate industrial and environmental applications of equilibrium systems.

c. Sample Learning and Assessment Activities

- Reaction rate laboratory investigations;
- Equilibrium simulations and ICE-table practice;
- Industrial equilibrium case studies;
- Kinetics modelling activities;
- Equilibrium calculations, assignments, quizzes, unit test.

Teaching and Learning Strategies

Instruction in SCH4U is grounded in the scientific investigation skills and inquiry processes identified in the Ontario Curriculum. These processes guide lesson design, assessment, and classroom interaction to ensure students develop deep conceptual understanding, scientific literacy, quantitative reasoning, and analytical problem-solving skills. Teaching strategies emphasize inquiry, experimentation, collaboration, and the thoughtful application of chemical concepts to real-world and scientific contexts.

• **Scientific inquiry and problem solving:** Students engage in laboratory investigations and case studies that require them to ask questions, analyze evidence, test hypotheses, and solve chemical problems using scientific reasoning.

• **Critical thinking and analysis:** Learners interpret chemical data, evaluate scientific evidence, analyze relationships within chemical systems, and assess the reliability of experimental results and conclusions.

• **Reflecting:** Students examine their own learning, evaluate the effectiveness of investigation strategies, and revise their thinking based on evidence, feedback, and chemical analysis.

• **Selecting tools and strategies:** Learners use appropriate laboratory tools, chemical models, simulations, digital resources, and quantitative techniques to investigate chemical systems and solve problems effectively.

• **Connecting:** Students connect chemical concepts across organic chemistry, bonding, thermochemistry, electrochemistry, kinetics, and equilibrium while relating chemistry to health, sustainability, industry, technology, and society.

• **Representing:** Learners communicate chemical understanding using equations, structural formulas, graphs, diagrams, reaction mechanisms, laboratory observations, scientific terminology, and written explanations.

• **Communicating:** Students articulate scientific reasoning clearly in written, oral, visual, and digital forms through discussions, laboratory reports, presentations, and inquiry activities.

These strategies ensure that students develop strong conceptual understanding, scientific literacy, inquiry skills, and confidence in applying chemistry to academic, industrial, environmental, and real-world contexts.

Culminating Task

Approx. Hours: 5

Students complete a chemical investigation, research assignment, or applied inquiry project integrating multiple strands of the course. The culminating task emphasizes scientific inquiry,

quantitative analysis, chemical reasoning, communication, and the application of chemistry to real-world and contemporary scientific issues.

Final Exam

Approx. Hours: 2

Students complete a proctored final examination evaluating conceptual understanding, chemical processes, scientific inquiry skills, quantitative problem solving, data interpretation, analytical reasoning, and application of knowledge across all course strands.

Instructional Approaches

Teaching and learning in SCH4U at Inukshuk Academy a wide range of strategies to ensure students develop strong conceptual understanding, scientific reasoning, analytical thinking, and confidence in applying chemistry to real-world and contemporary scientific issues. Instruction is guided by the scientific investigation processes and inquiry-based principles outlined in the Ontario Curriculum.

a. Inquiry-Based and Experiential Learning

Students learn chemistry most effectively through investigation, experimentation, modelling, and problem solving. Lessons regularly include laboratory activities, guided inquiry tasks, simulations, case studies, and real-world applications that reinforce chemical concepts.

Examples include:

- Investigating reaction rates and factors affecting chemical kinetics;
- Exploring organic structures, functional groups, and reaction pathways through models and simulations;
- Analyzing thermochemical reactions using calorimetry and energy diagrams;
- Investigating electrochemical cells, redox reactions, and cell potentials;
- Examining equilibrium systems and Le Châtelier's principle through data analysis.

b. Multiple Representations of Concepts

Students encounter chemical ideas through a combination of:

- Chemical equations, structural formulas, and reaction mechanisms;
- Graphs, tables, and quantitative data;
- Energy diagrams, molecular models, and equilibrium expressions;
- Laboratory observations and case-study evidence;
- Written explanations and scientific reasoning.

This approach supports deeper conceptual understanding and helps students connect chemical processes across molecular, macroscopic, and quantitative levels.

c. Use of Technology and Digital Tools

Digital tools are integrated throughout the course to enhance learning, support inquiry, and strengthen visualization skills. Technology is used to:

- Conduct virtual laboratories and chemistry simulations;
- Model molecules, bonding, organic reactions, and electrochemical systems;
- Analyze chemical data and reaction trends;
- Visualize equilibrium systems, energy changes, and reaction pathways;
- Research current chemical issues, technologies, and environmental applications;
- Create graphs, presentations, lab reports, and scientific models.

Examples include virtual lab platforms, molecular visualization tools, spreadsheets, graphing software, online scientific databases, and presentation tools.

d. Collaborative Scientific Inquiry

Scientific learning is strengthened through collaboration. Students work in pairs or small groups to:

- Conduct laboratory investigations and simulations;
- Analyze and interpret chemical data;
- Discuss scientific theories, case studies, and environmental issues;
- Compare observations and problem-solving strategies;
- Complete inquiry and research activities collaboratively.

Collaborative learning supports communication skills, critical thinking, scientific reasoning, and confidence in chemical investigation.

e. Differentiated Instruction

Instruction is adapted to support a variety of learning styles, readiness levels, and interests. Strategies include:

- Scaffolded laboratory and inquiry activities;
- Enrichment and extension tasks for advanced learners;
- Visual, hands-on, verbal, and digital supports for complex chemical systems;
- Guided practice and targeted intervention for students requiring additional support.

f. Explicit Teaching of Mathematical Processes

Students receive direct instruction and ongoing support in the scientific investigation skills emphasized in the Ontario Curriculum, including:

- Scientific inquiry and experimental design;
- Observation, measurement, and data collection;

- Quantitative analysis and interpretation;
- Evaluating scientific evidence and sources;
- Connecting chemical concepts to health, industry, sustainability, technology, and society;
- Communicating scientific reasoning clearly and accurately using appropriate chemical terminology, equations, units, and conventions.

Assessment and Evaluation

Assessment in SCH4U aligns with the principles of *Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools* (2010) [1]. Evaluation reflects students' most consistent achievement, with particular emphasis on recent evidence of learning.

Assessment serves three purposes:

a. Assessment for Learning (Diagnostic)

- Initial review of prerequisite chemistry concepts, mathematics skills, laboratory safety procedures, and scientific investigation skills;
- Diagnostic quizzes to identify gaps in chemistry knowledge, quantitative reasoning, and problem-solving ability;
- Informal observations, discussions, and concept checks;
- Readiness activities related to laboratory inquiry, graphing, calculations, and data interpretation.

b. Assessment as Learning (Formative)

- Homework and chemistry problem-solving activities;
- Laboratory investigations with ongoing feedback;
- Reflection tasks and self-assessment activities;
- Collaborative inquiry and quantitative problem-solving exercises;
- Draft submissions of laboratory reports, research assignments, and scientific investigations.

c. Assessment of Learning (Summative)

- Unit tests on major chemistry strands;
- Laboratory reports and scientific investigations;
- Research assignments and environmental or industrial chemistry case studies;
- Performance tasks involving real-world chemical applications;
- Culminating investigation or applied chemistry project;
- Final examination.

d. Achievement Chart Categories

Student achievement is evaluated across the four categories defined in the Ontario Curriculum for Science:

Knowledge & Understanding (30 percent)
Understanding of chemistry concepts, terminology, equations, structures, quantitative relationships, and processes involving organic chemistry, bonding theory, thermochemistry, electrochemistry, kinetics, and equilibrium.

Thinking & Inquiry (20 percent)
Use of scientific inquiry skills, critical thinking, chemical calculations, experimental design, data analysis, problem solving, and interpretation of scientific evidence.

Communication (20 percent)
Clarity and accuracy in scientific explanations, laboratory reports, chemical equations, diagrams, calculations, graphs, terminology, and communication of scientific reasoning.

Application (30 percent)
Application of chemistry knowledge and scientific skills to real-world contexts, environmental issues, industrial processes, health sciences, sustainability, and technological applications.

e. Final Evaluation (30 percent)

The final evaluation consists of:

1. Culminating Performance Task (10–15 percent)

A multi-step chemistry investigation, inquiry task, or applied research project. Examples may include:

- Investigating organic compounds and their industrial, environmental, or biological applications;
- Analyzing energy changes, reaction efficiency, or electrochemical systems through experimentation or modelling;
- Designing and conducting a chemistry experiment related to kinetics or equilibrium systems;
- Researching environmental chemistry, sustainability, or emerging chemical technologies.

2. Final Examination (15–20 percent)

A proctored examination assessing conceptual understanding, scientific inquiry skills, chemical calculations, laboratory analysis, data interpretation, analytical reasoning, and application of knowledge across all course strands.

3. Summary of Achievement Levels and Percentage Grade Ranges

Student achievement in secondary school courses is evaluated according to the Ontario Ministry of Education's four-level achievement scale. Each percentage grade corresponds to a level of achievement, as outlined below.

Percentage Grade Range	Achievement Level	Summary Description
80–100%	Level 4	Demonstrates a very high to outstanding level of achievement. Performance exceeds the provincial standard.
70–79%	Level 3	Demonstrates a high level of achievement. Performance meets the provincial standard. (This is the provincial expectation for student performance.)
60–69%	Level 2	Demonstrates a moderate level of achievement. Performance is below but approaching the provincial standard.
50–59%	Level 1	Demonstrates a passable level of achievement. Performance is significantly below the provincial standard. Further improvement is required for continued success.
Below 50%	Level 0	Insufficient achievement. Curriculum expectations have not been met. A credit will not be granted.

Academic Honesty and Integrity Policy

Inukshuk Academy is committed to fostering a learning environment based on honesty, responsibility, respect, and academic integrity. Students are expected to submit original work and properly acknowledge all sources of information, ideas, images, data, and wording used in assignments and investigations. Academic honesty is essential to maintaining fairness and trust in the evaluation process.

All submitted work must represent the student's own understanding and effort. Sources must be documented appropriately using MLA or APA citation style, as directed by the teacher. The use of generative artificial intelligence tools (e.g., ChatGPT) or other forms of external assistance must be disclosed and approved by the teacher. Undisclosed or inappropriate use of such tools may be treated as academic dishonesty.

Students may be asked to provide process work, rough drafts, notes, calculations, or planning documents to verify authorship and learning progress. If academic dishonesty occurs, the student and Principal may be notified, and consequences will be applied in accordance with school policy. Repeated incidents may result in escalating consequences.

1. Improper Citation

Improper citation occurs when a student fails to use appropriate citation formatting when referencing sources.

Grade Level	First Instance	Subsequent Instances
Grades 9–10	Warning and opportunity to resubmit	Warning and opportunity to resubmit
Grades 11–12	Warning and opportunity to resubmit	Opportunity to resubmit, maximum grade of 75%

2. Unaccredited Paraphrasing

Unaccredited paraphrasing occurs when a student rewrites another person's ideas without giving proper credit.

Grade Level	First Instance	Subsequent Instances
Grades 9–10	Warning and resubmission allowed	Resubmission allowed, maximum grade of 75%
Grades 11–12	Resubmission allowed, maximum grade of 75%	Resubmission allowed, maximum grade of 50%

3. Unaccredited Verbatim Copying

This occurs when a student copies sentences or passages directly from a source without proper citation.

Grade Level	First Instance	Subsequent Instances
Grades 9–10	Resubmission allowed, maximum grade of 75%	Resubmission allowed, maximum grade of 50%
Grades 11–12	Resubmission allowed, maximum grade of 50%	Grade of zero. No resubmission permitted

4. Full Plagiarism

Full plagiarism occurs when a student submits work entirely created by another person or source.

Grade Level	First Instance	Subsequent Instances
Grades 9–10	Grade of zero. No resubmission	Grade of zero. No resubmission
Grades 11–12	Grade of zero. No resubmission	Grade of zero and possible removal from the course

5. Missed Work

Students are responsible for reviewing lesson materials, completing missed assignments, and meeting established deadlines. Students are expected to remain informed about course expectations, due dates, and assessment requirements.

6. Homework Expectations

Students are expected to:

- Complete homework assignments, readings, and practice problems on time;
- Prepare for scheduled lessons, laboratories, discussions, and assessments;
- Participate actively and consistently in course activities and investigations.

If homework is repeatedly incomplete, the teacher may:

- Schedule a meeting with the student;
- Contact parents or guardians;
- Consult with school administration to support student success and progress.

Inclusion, accommodations & ELL supports

Inukshuk Academy is a small private school with limited accommodation resources. The school is committed to supporting students' access to learning within the scope of available staffing, programming, facilities, and course delivery structures.

Where possible, reasonable accommodations may be provided for students with documented learning needs, including limited support for Individual Education Plans (IEPs). Accommodations are considered on a case-by-case basis in consultation with the student, parents/guardians, teacher, and school administration.

Possible supports may include:

- Clear written instructions and success criteria;
- Guided notes, visual examples, and scaffolded practice;
- Reasonable extended time where appropriate;
- Preferential seating or reduced-distraction work space when available;
- Use of approved assistive technology;
- Check-ins with the teacher to support organization and progress;
- ELL support through simplified instructions, vocabulary support, and additional clarification.

Inukshuk Academy may not be able to provide specialized programming, intensive one-on-one support, modified curriculum expectations, or accommodations requiring resources beyond the school's capacity. Students requiring significant accommodations or specialized services may need additional external support.

Instructional Philosophy

Teaching and learning in SCH4U emphasize:

- Inquiry-based learning through laboratory investigations, simulations, modelling activities, and research tasks;
- Conceptual understanding supported by real-world chemical, industrial, environmental, and technological applications;
- Scientific investigation of organic chemistry, bonding theory, thermochemistry, electrochemistry, kinetics, and equilibrium systems;
- Multiple representations of chemical concepts, including equations, structural formulas, molecular models, energy diagrams, graphs, data tables, and written explanations;
- Collaboration through laboratory investigations, discussions, inquiry tasks, peer feedback, and scientific problem solving;
- Technology integration in data analysis, graphing, virtual labs, molecular modelling, simulations, research, and presentations.

This approach ensures students engage deeply with chemistry concepts while developing transferable scientific reasoning, quantitative analysis, inquiry, communication, and STEM skills.

Course Learning Resources

Students will engage with a variety of chemistry learning materials, both digital and print, selected to support inquiry, experimentation, quantitative analysis, and conceptual development.

a. Primary Resources

- Teacher-created notes, examples, laboratory activities, and practice problem sets;
- Chemistry investigations, molecular models, demonstrations, and simulation tools;
- Laboratory equipment including glassware, balances, thermometers, calorimeters, pH indicators, sensors, and measurement tools;
- Chemistry reference materials and scientific calculators;
- *Ontario Curriculum, Grades 11–12:* Mathematics *(2008)* [2]

b. Digital Tools and Platforms

- Virtual chemistry laboratories and interactive simulations;
- Molecular modelling and visualization tools for bonding, reactions, and organic chemistry;
- Spreadsheets or graphing software for chemical data analysis and calculations;
- Online scientific databases and chemistry research platforms;
- Presentation and collaboration tools for inquiry projects and scientific communication.

c. Supplementary Resources

- Scientific journals, articles, videos, and multimedia related to chemistry, environmental science, medicine, and technology;
- Practice problems, review materials, and examination preparation resources;
- Real-world case studies involving industrial chemistry, electrochemistry, thermochemistry, sustainability, pharmaceuticals, and emerging chemical technologies.

References

[1] Ministry of Education, "Growing Sucess," 2010. [Online]. Available: https://www.edu.gov.on.ca/eng/policyfunding/growsuccess.pdf.

[2] Ministry of Education, "Course Descriptions and Prerequisites," August 2024. [Online]. Available: https://www.dcp.edu.gov.on.ca/en/course-descriptions-and-prerequisites.