

Credit Equivalency Resource Package

Course Comparisons Quebec

**English
Math
Science**



reach every student



Introduction

Organizing Framework

Secondary school offers five years of general education, divided into two cycles. Cycle One, which lasts three years, enables students to consolidate the learning acquired in elementary school and to begin to think about their career options. From the third year on, optional subjects are added to the general curriculum, giving students the opportunity to explore various subject areas. At the end of the fifth year of secondary education, students are awarded a Secondary School Diploma (SSD) that provides access to college, but does not lead directly to university.

College education constitutes an intermediary level between compulsory secondary education and university education. Colleges (CEGEPs) offer two-year pre-university programs and three-year technical programs leading to a Diploma of College Studies (DCS) as well as shorter technical programs leading to an Attestation of College Studies (ACS). A Diploma of College Studies (DCS) is required for admission to university.

The programs of study are defined in terms of competencies/outcomes that correspond to the educational aims and essential knowledge for each subject.

Assessment and Evaluation

Formative evaluation is used as part of the overall learning process to support students in their process of learning. Evaluation is also used for summative purposes to determine the degree of development of the competencies/outcomes and record it in a progress report.

Evaluation Criteria are the observable standards for supporting and judging the development of the competency. The pass mark is 60%. Courses in Years 4 and 5 count toward graduation. Students require at least 54 units (credits), including 20 required units in secondary year 5 to graduate. One unit usually equals 25 hours. Criteria for marking examinations are available to teachers and students.

The Quebec Ministry of Education, Sports and Leisure (MELS) awards the Diploma of Secondary Studies to students who have accumulated 54 units from Secondary IV and V (20 must be from Secondary V.) The last digit in each course code indicates the number of units of credit that course is worth.

Note:

The following rubric may be useful in guiding decisions for granting a credit:

Very Limited Relationship – many overall expectations missing, student may be very challenged in subsequent courses that build from this course.

Considerable Relationship – several overall expectations are not met, but a generally thorough coverage of expectations is evident in course or in its prerequisite courses,...

Strong Relationship – all or almost all overall expectations are met, thorough coverage of expectations is evident in course or its prerequisite courses,...

Courses Compared

Quebec	Ontario
Introduction	
English	
Secondary Year 4 English or SELA IV, 630-416 or ENG-4061-3 and ENG-4062-3 (two term courses)	English, Grade 11, College Preparation ENG3C
Secondary Year 4 English or SELA IV, 630-416 or ENG-4061-3 and ENG-4062-3 (two term courses)	English, Grade 11, Workplace Preparation ENG3E
Secondary Year 4 English or SELA IV, 630-416 or ENG-4061-3 and ENG-4062-3 (two term courses)	English, Grade 11, University Preparation ENG3U
Secondary Year 5 English or SELA V (English as a First Language) 630-516 or as two parts ENG-5061-3 and ENG-5062-3	English, Grade 12, College Preparation ENG4C
Secondary Year 5 English or SELA V (English as a First Language) 630-516 or as two parts ENG-5061-3 and ENG-5062-3	English, Grade 12, Workplace Preparation ENG4E
Secondary Year 5 English or SELA V (English as a First Language) 630-516 or as two parts ENG-5061-3 and ENG-5062-3	English, Grade 12, University Preparation ENG4U
Mathematics	
Mathematics 514	Mathematics for Work and Everyday Life, Grade 12, Workplace Preparation MEL3E
Mathematics 536	Advanced Functions, Grade 12, University Preparation MHF4U
Mathematics 536	Functions, Grade 11, University Preparation MCR3U
Mathematics 526	Foundations for College Mathematics, Grade 11, College Preparation MBF3C
Mathematics 526	Mathematics for College Technology, Grade 12, College Preparation MCT4C
Science	
Chemistry 534 (CHE-5041-2, CHE-5042-2, CHE-5043-2)	Chemistry, Grade 12, University Preparation SCH4U
Physics 534 (PHS-5041-2, PHS-5042-2, PHS-5043-2)	Physics, Grade 11, University Preparation SPH3U
General Biology 534	Biology, Grade 12, University Preparation SBI4U
Geology 552 – 534 Cycle Two (Grade 10 & 11)	Earth and Space Science, Grade 12, University Preparation SES4U
Physical Science 416 (Cycle Two – Grade 10, 11)	Science, Grade 11, Workplace Preparation SNC3E
Physical Science 416 (Cycle Two – Grade 10, 11)	Science, Grade 11, University/College Preparation SNC3M
Tools and Methods of Science 532 TMS 532 (Cycle Two – Grade 10, 11)	Science, Grade 11, University/College Preparation SNC3M

	Quebec	Ontario
Course Name	Secondary Year 4 English or SELA IV, 630-416 or ENG-4061-3 and ENG-4062-3 (two term courses)	English, Grade 11, College Preparation ENG3C
Date of Curriculum	1981	2007 (draft)
Hours of Instruction	150	110
Additional Course Information	English language arts (for English as first language students) is required in secondary year 4.	ENG2P is a prerequisite for ENG3C.
Course Description	This course provides opportunities to develop students' abilities to effectively speak, listen, read, write and view in a variety of contexts. Students will develop an understanding of language and language processes. They will analyse print and non-print texts, including works of literature, informational texts and media. They will produce oral, written and visual texts using appropriate contexts, processes, strategies, and forms. Students will also use communication processes in effective ways to share and respond to viewpoints, and work collaboratively.	This course emphasizes the development of literacy, critical thinking, and communication skills. Students will study the content, form and style of informational texts and literary works from Canada and other countries; write reports, correspondence, and persuasive essays; and analyse media forms, audiences, and media industry practices. An important focus will be on establishing appropriate voice and using business and technical language with precision and clarity.
Strands/Major Concepts	<p>The student will show</p> <ul style="list-style-type: none"> • an understanding of the communication process • an understanding of the nature and function of language • an understanding of the types of discourse • the ability to understand an aural, written, or visual discourse • the ability to follow an appropriate process in composing an oral, written, or visual discourse • to develop his/her own viewpoint through participation in the communication process 	<p>Oral Communication</p> <ul style="list-style-type: none"> • Listening to Understand • Speaking to Communicate • Reflecting on Skills and Strategies <p>Reading</p> <ul style="list-style-type: none"> • Reading for Meaning • Understanding Form and Style • Reading with Fluency • Reflecting on Skills and Strategies <p>Writing</p> <ul style="list-style-type: none"> • Developing and Organizing Content • Using Knowledge of Form and Style • Applying Knowledge of Conventions • Reflecting on Skills and Strategies <p>Media Literacy</p> <ul style="list-style-type: none"> • Understanding Media Texts • Understanding Forms and Conventions • Creating Media Texts • Reflecting on Skills and Strategies
Assessment/Evaluation	<p>Assessment is both criterion referenced and norm referenced; formative assessments are strictly criterion referenced while summative assessments provide opportunities for both types.</p> <p>There are several End of Cycle Two (the last two years of secondary school) minimum expectation contexts. These include explaining orally a topic of interest, taking part in group discussion and arriving at consensus to a shared problem, listening to or viewing a newscast, reading informational text, reading and responding to a literary text, composing for a variety of purposes and audiences.</p>	<p>Assessment is criterion-referenced.</p> <p>Level 1 (50-59%) indicates the minimally acceptable performance in relation to the prescribed course expectations.</p> <p>ENG3C counts as one of the compulsory courses required for graduation.</p>
Overall Comparison	<p>There is a considerable relationship between the two courses. Most of the major concepts in ENG3C are addressed in SELA IV, including those related to oral communication, reading and writing, and using and understanding media forms and texts.</p> <p>The Quebec course does not include expectations which specifically address metacognition. The course also does not explicitly address the creation of media works.</p>	
Additional Comments	<p>In Quebec, secondary school begins after Grade 6.</p> <p>Secondary school offers five years of general education, divided into two cycles. Cycle One, which lasts three years, enables students to consolidate the learning acquired in elementary school and to begin to think about their career options. From the third year on, optional subjects are added to the general curriculum, giving students the opportunity to explore various subject areas (sciences, arts, etc.). At the end of the fifth year of secondary education, students are awarded a Secondary School Diploma (SSD) that provides access to college, but does not lead directly to university.</p>	

	Quebec	Ontario
Course Name	Secondary Year 4 English or SELA IV, 630-416 or ENG-4061-3 and ENG-4062-3 (two term courses)	English, Grade 11, Workplace Preparation ENG3E
Date of Curriculum	1981	2007 (draft)
Hours of Instruction	150	110
Additional Course Information	English language arts (for English as first language students) is required in Secondary Year 4.	ENG2L or ENG2P are pre-requisites
Course Description	This course provides opportunities to develop students' abilities to effectively speak, listen, read, write and view in a variety of contexts. Students will develop an understanding of language and language processes. They will analyse print and non-print texts, including works of literature, informational texts and media. They will produce oral, written and visual texts using appropriate contexts, processes, strategies, and forms. Students will also use communication processes in effective ways to share and respond to viewpoints, and work collaboratively.	This course emphasizes the development of literacy, critical thinking, and communication skills. Students will study the content, form and style of informational texts and literary works; write explanations, letters, and reports; and investigate the connections among media forms, audiences, and media industry practices. An important focus will be on using language clearly, accurately, and effectively in a variety of contexts.
Strands/Major Concepts	<p>The student will show</p> <ul style="list-style-type: none"> • an understanding of the communication process • an understanding of the nature and function of language • an understanding of the types of discourse • the ability to understand an aural, written, or visual discourse • the ability to follow an appropriate process in composing an oral, written, or visual discourse • to develop his/her own viewpoint through participation in the communication process 	<p>Oral Communication</p> <ul style="list-style-type: none"> • Listening to Understand • Speaking to Communicate • Reflecting on Skills and Strategies <p>Reading</p> <ul style="list-style-type: none"> • Reading for Meaning • Understanding Form and Style • Reading with Fluency • Reflecting on Skills and Strategies <p>Writing</p> <ul style="list-style-type: none"> • Developing and Organizing Content • Using Knowledge of Form and Style • Applying Knowledge of Conventions • Reflecting on Skills and Strategies <p>Media Literacy</p> <ul style="list-style-type: none"> • Understanding Media Texts • Understanding Forms and Conventions • Creating Media Texts • Reflecting on Skills and Strategies
Assessment/Evaluation	<p>Assessment is both criterion referenced and norm referenced; formative assessments are strictly criterion referenced while summative assessments provide opportunities for both types.</p> <p>There are several End of Cycle Two (the last two years of secondary school) minimum expectation contexts. These include explaining orally a topic of interest, taking part in group discussion and arriving at consensus to a shared problem, listening to or viewing a newscast, reading informational text, reading and responding to a literary text, and composing for a variety of purposes and audiences.</p>	<p>Assessment is criterion-referenced.</p> <p>Level 1 (50-59%) indicates the minimally acceptable performance in relation to the prescribed course expectations.</p> <p>ENG3E counts as one of the compulsory courses required for graduation.</p>
Overall Comparison	<p>There is a considerable relationship between the two courses. Most of the major concepts in ENG3E are addressed in SELA IV, including those related to oral communication, reading and writing, and using and understanding media forms and texts.</p> <p>The Quebec course does not include expectations which specifically address metacognition. The course also does not explicitly address the creation of media works, and the knowledge and skills specific to the workplace and other contexts outside the classroom.</p>	

	Quebec	Ontario
Course Name	Secondary Year 4 English or SELA IV, 630-416 or ENG-4061-3 and ENG-4062-3 (two-term courses)	English, Grade 11, University Preparation ENG3U
Date of Curriculum	1981	2007 (draft)
Hours of Instruction	150	110
Additional Course Information	English language arts (for English as first language students) is required in secondary year 4.	ENG2D is a prerequisite for ENG3U.
Course Description	This course provides opportunities to develop students' abilities to effectively speak, listen, read, write and view in a variety of contexts. Students will develop an understanding of language and language processes. They will analyse print and non-print texts, including works of literature, informational texts and media. They will produce oral, written and visual texts using appropriate contexts, processes, strategies, and forms. Students will also use communication processes in effective ways to share and respond to viewpoints, and work collaboratively.	This course emphasizes the development of literacy, critical thinking, and communication skills. Students will analyse challenging texts from various periods; conduct research and analyse the information gathered; write persuasive and literary essays; and analyse the relationship among media forms, audiences, and media industry practices. An important focus will be on understanding the development of the English language.
Strands/Major Concepts	<p>The student will show</p> <ul style="list-style-type: none"> • an understanding of the communication process • an understanding of the nature and function of language • an understanding of the types of discourse • the ability to understand an aural, written, or visual discourse • the ability to follow an appropriate process in composing an oral, written, or visual discourse • to develop his/her own viewpoint through participation in the communication process 	<p>Oral Communication</p> <ul style="list-style-type: none"> • Listening to Understand • Speaking to Communicate • Reflecting on Skills and Strategies <p>Reading</p> <ul style="list-style-type: none"> • Reading for Meaning • Understanding Form and Style • Reading with Fluency • Reflecting on Skills and Strategies <p>Writing</p> <ul style="list-style-type: none"> • Developing and Organizing Content • Using Knowledge of Form and Style • Applying Knowledge of Conventions • Reflecting on Skills and Strategies <p>Media Literacy</p> <ul style="list-style-type: none"> • Understanding Media Texts • Understanding Forms and Conventions • Creating Media Texts • Reflecting on Skills and Strategies
Assessment/Evaluation	<p>Assessment is both criterion referenced and norm referenced; formative assessments are strictly criterion referenced while summative assessments provide opportunities for both types.</p> <p>There are several End of Cycle Two (the last two years of secondary school) minimum expectation contexts. These include explaining orally a topic of interest, taking part in group discussion and arriving at consensus to a shared problem, listening to or viewing a newscast, reading informational text, reading and responding to a literary text, and composing for a variety of purposes and audiences.</p>	<p>Assessment is criterion-referenced.</p> <p>Level 1 (50-59%) indicates the minimally acceptable performance in relation to the prescribed course expectations.</p> <p>ENG3U counts as one of the compulsory courses required for graduation.</p>
Overall Comparison	<p>There is a considerable relationship between the two courses. Most of the major concepts in ENG3U are addressed in the Quebec course, including those related to oral communication, reading and writing, and using and understanding media forms and texts.</p> <p>The Quebec course does not include expectations which specifically address metacognition (reflecting on skills and strategies) and the creation of media works.</p>	

	Quebec	Ontario
Course Name	Secondary Year 5 English or SELA V (English as a First Language) 630-516 (or as two parts ENG-5061-3 and ENG-5062-3)	English, Grade 12, College Preparation ENG4C
Date of Curriculum	1981	2007 (draft)
Hours of Instruction	150	110
Additional Course Information	English language arts (for English as first language students) is required in secondary year 5. Secondary V English is a required course for admission into college education, which includes technical education and pre-university education.	ENG3C is a prerequisite for ENG4C.
Course Description	This course provides opportunities to develop students' abilities to effectively speak, listen, read, write and view in a variety of contexts. Students will develop an understanding of language and language processes. They will analyse print and non-print texts, including works of literature, informational texts and media. They will produce oral, written and visual texts using appropriate contexts, processes, strategies, and forms. Students will also use communication processes in effective ways to share and respond to viewpoints, and work collaboratively.	This course emphasizes the development of literacy, critical thinking, and communication skills. Students will analyse information texts and literary works from various time periods, countries, and cultures: write research reports, summaries, and short analytical essays; complete an independent study project; and analyse interactions among media forms, audiences, and media industry practices. An important focus will be on establishing appropriate style and using business and technical language effectively.
Strands/Major Concepts	<p>The student will show</p> <ul style="list-style-type: none"> • an understanding of the communication process • an understanding of the nature and function of language • an understanding of the types of discourse • the ability to understand an aural, written, or visual discourse • the ability to follow an appropriate process in composing an oral, written, or visual discourse • to develop his/her own viewpoint through participation in the communication process 	<p>Oral Communication</p> <ul style="list-style-type: none"> • Listening to Understand • Speaking to Communicate • Reflecting on Skills and Strategies <p>Reading</p> <ul style="list-style-type: none"> • Reading for Meaning • Understanding Form and Style • Reading with Fluency • Reflecting on Skills and Strategies <p>Writing</p> <ul style="list-style-type: none"> • Developing and Organizing Content • Using Knowledge of Form and Style • Applying Knowledge of Conventions • Reflecting on Skills and Strategies <p>Media Literacy</p> <ul style="list-style-type: none"> • Understanding Media Texts • Understanding Forms and Conventions • Creating Media Texts • Reflecting on Skills and Strategies
Assessment/Evaluation	<p>Assessment is both criterion referenced and norm referenced; formative assessments are strictly criterion referenced while summative assessments provide opportunities for both types.</p> <p>There is a provincial examination at the end of the course. It consists of three parts: Reading: responding to literature, Writing: writing to inform, and Writing: writing to engage.</p> <p>There are several End of Cycle Two (the last two years of secondary school) minimum expectation contexts. These include explaining orally a topic of interest, taking part in group discussion and arriving at consensus to a shared problem, listening to or viewing a newscast, reading informational text, reading and responding to a literary text, and composing for a variety of purposes and audiences.</p>	<p>Assessment is criterion-referenced.</p> <p>Level 1 (50-59%) indicates the minimally acceptable performance in relation to the prescribed course expectations.</p> <p>ENG4C counts as one of the compulsory courses required for graduation.</p>
Overall Comparison	<p>There is a considerable relationship between the two courses. Most of the major concepts in ENG4C are addressed in SELA V, including those related to oral communication, reading and writing, and using and understanding media forms and texts.</p> <p>The Quebec course does not specifically address metacognition (reflecting on skills and strategies). The course also does not explicitly include the creation of media works.</p>	

	Quebec	Ontario
Course Name	Secondary Year 5 English or SELA V (English as a First Language) 630-516 (or as two parts ENG-5061-3 and ENG-5062-3)	English, Grade 12, Workplace Preparation ENG4E
Date of Curriculum	1981	2007 (draft)
Hours of Instruction	150	110
Additional Course Information	English language arts (for English as first language students) is required in secondary year 5. Secondary V English is a required course for admission into college education, which includes technical education and pre-university education.	ENG3E
Course Description	This course provides opportunities to develop students' abilities to effectively speak, listen, read, write and view in a variety of contexts. Students will develop an understanding of language and language processes. They will analyse print and non-print texts, including works of literature, informational texts and media. They will produce oral, written and visual texts using appropriate contexts, processes, strategies, and forms. Students will also use communication processes in effective ways to share and respond to viewpoints, and work collaboratively.	This course emphasizes consolidation of literacy, critical thinking, and communication skills. Students will study information texts and literature from various countries and cultures; write summaries, reports, résumés, and short essays; complete an independent research project; and explain the connections among media forms, audiences and media industry practices. An important focus will be on using specialized language related to the workplace accurately and coherently in appropriate contexts.
Strands/Major Concepts	The student will show <ul style="list-style-type: none"> • an understanding of the communication process • an understanding of the nature and function of language • an understanding of the types of discourse • the ability to understand an aural, written, or visual discourse • the ability to follow an appropriate process in composing an oral, written, or visual discourse • to develop his/her own viewpoint through participation in the communication process 	<p>Oral Communication</p> <ul style="list-style-type: none"> • Listening to Understand • Speaking to Communicate • Reflecting on Skills and Strategies <p>Reading</p> <ul style="list-style-type: none"> • Reading for Meaning • Understanding Form and Style • Reading with Fluency • Reflecting on Skills and Strategies <p>Writing</p> <ul style="list-style-type: none"> • Developing and Organizing Content • Using Knowledge of Form and Style • Applying Knowledge of Conventions • Reflecting on Skills and Strategies <p>Media Literacy</p> <ul style="list-style-type: none"> • Understanding Media Texts • Understanding Forms and Conventions • Creating Media Texts • Reflecting on Skills and Strategies
Assessment/Evaluation	Assessment is both criterion referenced and norm referenced; formative assessments are strictly criterion referenced while summative assessments provide opportunities for both types. There is a provincial examination at the end of the course. It consists of three parts: Reading: responding to literature, Writing: writing to inform, and Writing: writing to engage. There are several End of Cycle Two (the last two years of secondary school) minimum expectation contexts. These include explaining orally a topic of interest, taking part in group discussion and arriving at consensus to a shared problem, listening to or viewing a newscast, reading informational text, reading and responding to a literary text, and composing for a variety of purposes and audiences.	Assessment is criterion-referenced. Level 1 (50-59%) indicates the minimally acceptable performance in relation to the prescribed course expectations. ENG4E counts as one of the compulsory courses required for graduation.
Overall Comparison	There is a considerable relationship between the two courses. Most of the major concepts in ENG4E are addressed in SELA V, including those related to oral communication, reading and writing, and using and understanding media forms and texts. The Quebec course does not include expectations which specifically address metacognition. The course also does not explicitly address the creation of media works, and to the knowledge and skills specific to the workplace and other contexts outside the classroom.	

	Quebec	Ontario
Course Name	Secondary Year 5 English or SELA V (English as a First Language) 630-516 (or as two parts ENG-5061-3 and ENG-5062-3)	English, Grade 12, University Preparation ENG4U
Date of Curriculum	1981	2007 (draft)
Hours of Instruction	150	110
Additional Course Information	English language arts (for English as first language students) is required in secondary year 5. Secondary V English is a required course for admission into college education, which includes technical education and pre-university education.	ENG3U is a prerequisite for ENG4U.
Course Description	This course provides opportunities to develop students' abilities to effectively speak, listen, read, write and view in a variety of contexts. Students will develop an understanding of language and language processes. They will analyse print and non-print texts, including works of literature, informational texts and media. They will produce oral, written and visual texts using appropriate contexts, processes, strategies, and forms. Students will also use communication processes in effective ways to share and respond to viewpoints, and work collaboratively.	This course emphasizes consolidation of literacy, critical thinking, and communication skills. Students will analyse a range of challenging texts from various time periods, countries, and cultures, write analytical and argumentative essays and a major paper for an independent literary research project, and apply key concepts to analyse media works. An important focus will be on understanding academic language and using it coherently and confidently in discussion and argument.
Strands/Major Concepts	<p>The student will show</p> <ul style="list-style-type: none"> • an understanding of the communication process • an understanding of the nature and function of language • an understanding of the types of discourse • the ability to understand an aural, written, or visual discourse • the ability to follow an appropriate process in composing an oral, written, or visual discourse • to develop his/her own viewpoint through participation in the communication process 	<p>Oral Communication</p> <ul style="list-style-type: none"> • Listening to Understand • Speaking to Communicate • Reflecting on Skills and Strategies <p>Reading</p> <ul style="list-style-type: none"> • Reading for Meaning • Understanding Form and Style • Reading with Fluency • Reflecting on Skills and Strategies <p>Writing</p> <ul style="list-style-type: none"> • Developing and Organizing Content • Using Knowledge of Form and Style • Applying Knowledge of Conventions • Reflecting on Skills and Strategies <p>Media Literacy</p> <ul style="list-style-type: none"> • Understanding Media Texts • Understanding Forms and Conventions • Creating Media Texts • Reflecting on Skills and Strategies
Assessment/Evaluation	<p>Assessment is both criterion referenced and norm referenced; formative assessments are strictly criterion referenced while summative assessments provide opportunities for both types.</p> <p>There is a provincial examination at the end of the course. It consists of three parts: Reading: responding to literature, Writing: writing to inform, and Writing: writing to engage.</p> <p>There are several End of Cycle Two (the last two years of secondary school) minimum expectation contexts. These include explaining orally a topic of interest, taking part in group discussion and arriving at consensus to a shared problem, listening to or viewing a newscast, reading informational text, reading and responding to a literary text, and composing for a variety of purposes and audiences.</p>	<p>Assessment is criterion-referenced.</p> <p>Level 1 (50-59%) indicates the minimally acceptable performance in relation to the prescribed course expectations.</p> <p>ENG4U counts as one of the compulsory courses required for graduation.</p>
Overall Comparison	<p>There is a considerable relationship between the two courses. Most of the major concepts in ENG4U are addressed in SELA V, including those related to oral communication, reading and writing, and using and understanding media forms and texts.</p> <p>The Quebec course does not specifically address metacognition (reflecting on skills and strategies). The course also does not explicitly include the creation of media works.</p>	

	Quebec	Ontario						
Course Name	Mathematics 514	Mathematics for Work and Everyday Life, Grade 11, Workplace Preparation MEL3E						
Date of Curriculum	1997	2007						
Hours of Instruction	100	110						
Additional Course Information	Mathematics 416	Prerequisite: Principles of Mathematics, Grade 9, Academic, or Foundations of Mathematics, Grade 9, Applied, or a ministry-approved locally developed Grade 10 mathematics course						
Course Description	Mathematics 514 is part of the basic secondary school curriculum and provides the students with the skills required by every citizen to function productively in society. The course is designed to have students apply optimization techniques, analyze statistical data, and analyze geometric situations.	This course enables students to broaden their understanding of mathematics as it is applied in the workplace and daily life. Students will solve problems associated with earning money, paying taxes, and making purchases; apply calculations of simple and compound interest in saving, investing, and borrowing; and calculate the costs of transportation and travel in a variety of situations. Students will consolidate their mathematical skills as they solve problems and communicate their thinking.						
Strands/Major Concepts	<p>Optimization</p> <ul style="list-style-type: none"> • solve problems using graphs (digraphs, Euler paths, ...) • solve systems of linear inequalities <p>Statistics</p> <ul style="list-style-type: none"> • Scatter plots, correlation • Simple probabilities <p>Geometry</p> <ul style="list-style-type: none"> • Distance between 2 points • Geometric probability 	<p>Earning and Purchasing</p> <p>Saving, Investing, and Borrowing</p> <p>Transportation and Travel</p>						
Assessment/Evaluation	<p>There are no pre-defined requirements for assessment of student achievement within the current curriculum policy document. Policy does identify a mix of criterion-referenced and norm-referenced grading. Guidelines are provided for the weighting of content:</p> <table style="margin-left: 20px;"> <tr> <td>Optimization</td> <td>50%</td> </tr> <tr> <td>Geometry</td> <td>20%</td> </tr> <tr> <td>Statistics</td> <td>30%</td> </tr> </table> <p>There is a common provincial exam for Math 514.</p>	Optimization	50%	Geometry	20%	Statistics	30%	<p>Assessment is criterion-referenced.</p> <p>Level 1 (50-59%) indicates the minimally acceptable performance in relation to the prescribed course expectations.</p>
Optimization	50%							
Geometry	20%							
Statistics	30%							
Overall Comparisons	<p>There is a very limited relationship between the two courses.</p> <p>Math 514 is intended as basic math but has content that is very different from similar workplace math programs in Ontario and across Canada.</p> <p>Math 514 does not have the application focus evident in Workplace preparation courses in Ontario, nor does it have the algebraic content to align with any College preparation courses in Ontario.</p> <p>Math 514 has expectations that do not align with workplace math programs in Ontario or other provinces outside of Quebec.</p> <p>There are NO Overall Expectations in Mathematics for Work and Everyday Life (MEL3E) that are explicitly found in the current Quebec Mathematics 514 provincial curriculum.</p>							

	Quebec	Ontario
Course Name	Mathematics 536	Advanced Functions, Grade 12, University Preparation MHF4U
Date of Curriculum	1997	2007
Hours of Instruction	100	110
Additional Course Information	Prerequisite: Mathematics 436. (Math 436 and Math 536 are described as the advanced sequence of math courses in Grades 10 and 11 in Quebec)	Prerequisite: Functions, Grade 11, University Preparation, or Mathematics for College Technology, Grade 12, College Preparation
Course Description	Students will work with inequalities and systems of inequalities involving real variables and then use them to solve optimization problems. They will then analyze different types of functions involving real variables; absolute value functions, step functions, square root functions, rational functions, exponential functions, and logarithmic and trigonometric functions. They will also study the composition of functions and operations involving functions as well as inverse of a function, and they will solve problems using these functions as models for different situations.	This course extends students' experience with functions. Students will investigate the properties of polynomial, rational, logarithmic, and trigonometric functions; develop techniques for combining functions; broaden their understanding of rates of change; and develop facility in applying these concepts and skills. Students will also refine their use of the mathematical processes necessary for success in senior mathematics. This course is intended both for students taking the Calculus and Vectors course as a prerequisite for a university program and for those wishing to consolidate their understanding of mathematics before proceeding to any one of a variety of university programs.
Strands/Major Concepts	Algebra <ul style="list-style-type: none"> Systems of inequalities Graph and solve problems using functions (square root, rational, exponential, log, trig) Inverse functions, composition of functions Solve problems using geometric loci of first and second degree relations (including conics) Geometry <ul style="list-style-type: none"> Solve geometric problems (including work with vectors) Statistics <ul style="list-style-type: none"> One and Two variable statistics (measures of dispersion, normal distribution, regression line and correlation coefficient) 	Exponential and Logarithmic Functions Trigonometric Functions Polynomial and Rational Functions Characteristics of Functions
Assessment/Evaluation	There are no pre-defined requirements for assessment of student achievement within the current curriculum policy document. Policy does identify a mix of criterion-referenced and norm-referenced grading. Guidelines are provided for the weighting of content: Algebra 67% Geometry 23% Statistics 10% There are common provincial exams in the prerequisite course, Math 436, but not in Math 536.	
Overall Comparisons	<p>There is a very limited relationship between the two courses. Mathematics 536 covers several of the overall expectations of MHF4U but not always to the same depth or requiring the same level of application. Students in Mathematics 536 do not work with polynomial functions nor with rates of change. Students in Mathematics 536 do work with topics such as conics, statistical distributions, and vectors that are not included in MHF4U or its prerequisites.</p> <p>Overall Expectations in Advanced Functions, Grade 12, (MHF4U) that are NOT found in the Quebec course Math 536 or its prerequisites:</p> <p>Polynomial and Rational Functions</p> <ul style="list-style-type: none"> identify and describe some key features of polynomial functions, and make connections between the numeric, graphical, and algebraic representations of polynomial functions; solve problems involving polynomial and simple rational equations graphically and algebraically; demonstrate an understanding of solving polynomial and simple rational inequalities <p>Exponential and Logarithmic Functions</p> <ul style="list-style-type: none"> Identify and describe some key features of the graphs of logarithmic functions, make connections among the numeric, graphical and algebraic representations of logarithmic functions, and solve related problems graphically; (partial match, less emphasis on applications in Math 536) <p>Characteristics of Functions</p> <ul style="list-style-type: none"> demonstrate an understanding and instantaneous rate of change, and determine, numerically and graphically, and interpret the average rate of change of a function over a given interval and the instantaneous rate of change for a given function at a given point; 	

	Quebec	Ontario
Course Name	Mathematics 536	Functions, Grade 11, University Preparation MCR3U
Date of Curriculum	1997	2007
Hours of Instruction	100	110
Additional Course Information	Prerequisite: Mathematics 436. (Math 436 and Math 536 are described as the advanced sequence of math courses in Grades 10 and 11 in Quebec)	Prerequisite: Principles of Mathematics, Grade 10, Academic
Course Description	Students will work with inequalities and systems of inequalities involving real variables and then use them to solve optimization problems. They will then analyze different types of functions involving real variables; absolute value functions, step functions, square root functions, rational functions, exponential functions, and logarithmic and trigonometric functions. They will also study the composition of functions and operations involving functions as well as inverse of a function, and they will solve problems using these functions as models for different situations.	This course introduces the mathematical concept of the function by extending students' experiences with linear and quadratic relations. Students will investigate properties of discrete and continuous functions, including trigonometric and exponential functions; represent functions numerically, algebraically, and graphically; solve problems involving applications of functions; investigate inverse functions; and develop facility in determining equivalent algebraic expressions. Students will reason mathematically and communicate their thinking as they solve multi-step problems.
Strands/Major Concepts	Algebra <ul style="list-style-type: none"> • Systems of inequalities • Graph and solve problems using functions (square root, rational, exponential, log, trig) • Inverse functions, composition of functions • Solve problems using geometric loci of first and second degree relations (including conics) Geometry <ul style="list-style-type: none"> • Solve geometric problems (including work with vectors) Statistics <ul style="list-style-type: none"> • One and Two variable statistics (measures of dispersion, normal distribution, regression line and correlation coefficient) 	Characteristics of Functions Exponential Functions Discrete Functions Trigonometric Functions
Assessment/Evaluation	There are no pre-defined requirements for assessment of student achievement within the current curriculum policy document. Guidelines are provided for the weighting of content: Algebra 67% Geometry 23% Statistics 10% There are common provincial exams in the prerequisite course, Math 426, but not in Math 526.	
Overall Comparisons	There is a considerable relationship between the two courses. Mathematics 536 covers many of the overall expectations of MCR3U but not always requiring the same level of application. Students in Mathematics 536 do work with topics such as conics, statistical distributions, logarithms, composition of functions, and vectors that are not included in MCR3U or its prerequisites. Overall Expectations in Functions (MCR3U) that are NOT found in the Quebec course Math 536 or its prerequisites: Discrete Functions <ul style="list-style-type: none"> • demonstrate an understanding of recursive sequences, represent recursive sequences in a variety of ways, and make connections to Pascal's triangle; • demonstrate an understanding of the relationships involved in arithmetic and geometric sequences and series, and solve related problems; • make connections between sequences, series, and financial applications, and solve problems involving compound interest and ordinary annuities. 	
Additional Comments	Note: Math 536 includes several expectations of Advanced Functions, Grade 12, University Preparation (MHF4U). See the report on MHF4U. The secondary program in Quebec is from grade 7 to grade 11. Mathematics 400 series courses are at the grade 10 level in Quebec. Mathematics 500 series courses are at the grade 11 level in Quebec, which is the final year of secondary school.	

	Quebec	Ontario
Course Name	Mathematics 526	Foundations for College Mathematics, Grade 11, College Preparation MBF3C
Date of Curriculum	2000	2007
Hours of Instruction	100	110
Additional Course Information	Mathematics 426	Prerequisite: Foundations of Mathematics, Grade 10, Applied
Course Description	Mathematics 526 is the second course in the sequence of mathematics courses, which falls between the basic sequence (i.e. Math 416-Math 514) and the advanced sequence (i.e. Math 436-Math 536) in terms of the amount of material covered, the detail involved and the complexity of the situations, problems and applications studied. The course is designed to have students use algebra, analyze geometric situations, and analyze statistical data.	This course enables students to broaden their understanding of mathematics as a problem solving tool in the real world. Students will extend their understanding of quadratic relations; investigate situations involving exponential growth; solve problems involving compound interest; solve financial problems connected with vehicle ownership; develop their ability to reason by collecting, analysing, and evaluating data involving one variable; connect probability and statistics; and solve problems in geometry and trigonometry. Students will consolidate their mathematical skills as they solve problems and communicate their thinking.
Strands/Major Concepts	Algebra <ul style="list-style-type: none"> • Systems of 1st-degree inequalities • Graph and solve problems using functions (square root, rational, exponential, log, trig) • Solve trig, exponential and log equations • Solve problems using geometric loci of first and second degree relations (including conics) Geometry <ul style="list-style-type: none"> • Solve geometric problems Statistics <ul style="list-style-type: none"> • One and Two variable statistics (measures of dispersion, normal distribution, and correlation coefficient) 	Mathematical Models Personal Finance Geometry And Trigonometry Data Management
Assessment/Evaluation	There are no pre-defined requirements for assessment of student achievement within the current curriculum policy document. Guidelines are provided for the weighting of content: Algebra 68% Geometry 20% Statistics 12% There are common provincial exams in the prerequisite course, Math 426, but not in Math 526.	
Overall Comparisons	There is a considerable relationship between the two courses. Students who have successfully completed Mathematics 526 have a generally thorough knowledge of the expectations of MBF3C. The reverse would not be true. Quebec's course requires students to work with logarithms, rational functions, inequalities, conics, and statistical distributions that are not included in the expectations in MBF3C and its prerequisite courses. Several of the expectations (e.g., sine and cosine law) were taught in the prerequisite course to Math 526. Overall Expectations in Foundations of College Mathematics (MBF3C) that are NOT found in Math 526 or its prerequisites: Personal Finance <ul style="list-style-type: none"> • compare simple and compound interest, relate compound interest to exponential growth, and solve problems involving compound interest; • compare services available from financial institutions, and solve problems involving the cost of making purchases on credit; • interpret information about owning and operating a vehicle, and solve problems involving the associated costs. 	
Additional Comments	Note: Math 526 includes several expectations of Mathematics for College Technology, Grade 12, College Preparation (MCT4C). See the report on MCT4C. The secondary program in Quebec is from grade 7 to grade 11. Mathematics 400 series courses are at the grade 10 level in Quebec. Mathematics 500 series courses are at the grade 11 level in Quebec, which is the final year of secondary school.	

	Quebec	Ontario						
Course Name	Mathematics 526	Mathematics for College Technology, Grade 12, College Preparation MCT4C						
Date of Curriculum	2000	2007						
Hours of Instruction	100	110						
Additional Course Information	Mathematics 426	Prerequisite: Functions and Applications, Grade 11, University/College Preparation or Functions, Grade 11, University Preparation						
Course Description	Mathematics 526 is the second course in the sequence of mathematics courses, which falls between the basic sequence (i.e. Math 416-Math 514) and the advanced sequence (i.e. Math 436-Math 536) in terms of the amount of material covered, the detail involved and the complexity of the situations, problems and applications studied. The course is designed to have students use algebra, analyze geometric situations, and analyze statistical data.	This course enables students to extend their knowledge of functions. Students will investigate and apply properties of polynomial, exponential, and trigonometric functions; continue to represent functions numerically, graphically, and algebraically; develop facility in simplifying expressions and solving equations; and solve problems that address applications of algebra, trigonometry, vectors, and geometry. Students will reason mathematically and communicate their thinking as they solve multi-step problems. This course prepares students for a variety of college technology programs.						
Strands/Major Concepts	<p>Algebra</p> <ul style="list-style-type: none"> • Systems of 1st-degree inequalities • Graph and solve problems using functions (square root, rational, exponential, log, trig) • Solve trig, exponential and log equations • Solve problems using geometric loci of first and second degree relations (including conics) <p>Geometry</p> <ul style="list-style-type: none"> • Solve geometric problems <p>Statistics</p> <ul style="list-style-type: none"> • One and Two variable statistics (measures of dispersion, normal distribution, and correlation coefficient) 	<p>Exponential Functions</p> <p>Polynomial Functions</p> <p>Trigonometric Functions</p> <p>Applications of Geometry</p>						
Assessment/Evaluation	<p>There are no pre-defined requirements for assessment of student achievement within the current curriculum policy document. Guidelines are provided for the weighting of content:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">Algebra</td> <td style="text-align: right;">68%</td> </tr> <tr> <td>Geometry</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>Statistics</td> <td style="text-align: right;">12%</td> </tr> </table> <p>There are common provincial exams in the prerequisite course, Math 426, but not in Math 526.</p>	Algebra	68%	Geometry	20%	Statistics	12%	
Algebra	68%							
Geometry	20%							
Statistics	12%							
Overall Comparisons	<p>There is a very limited relationship between the two courses. Math 526 covers many of the overall expectations of MCT4C but not always to the same depth or requiring the same level of application. Students in Mathematics 526 do not work with polynomial functions, with vectors, and do limited work with trigonometric functions. Students in Mathematics 526 do work with topics such as conics, and statistical distributions that are not included in MCT4C or its prerequisites.</p> <p>Overall Expectations in Mathematics for College Technology, Grade 12 (MCT4C) that are NOT found in the Quebec course or its prerequisites.</p> <p>Polynomial Functions</p> <ul style="list-style-type: none"> • recognize and evaluate polynomial functions, describe key features of their graphs, and solve problems using graphs of polynomial functions; • make connections between the numeric, graphical, and algebraic representations of polynomial functions; • solve polynomial equations by factoring, make connections between functions and formulas, and solve problems involving polynomial expressions arising from a variety of applications. <p>Applications of Geometry</p> <ul style="list-style-type: none"> • represent vectors, add and subtract vectors, and solve problems using vector models, including those arising from real-world applications. <p>Trigonometric Functions</p> <ul style="list-style-type: none"> • demonstrate an understanding that sinusoidal functions can be used to model some periodic phenomena, and solve related problems, including those arising from real-world applications. 							

	Quebec	Ontario
Course Name	Chemistry 534 (CHE-5041-2, CHE-5042-2, CHE-5043-2)	Chemistry, Grade 12, University Preparation SCH4U
Date of Curriculum	1992. Revised curriculum for implementation in 2009.	2000
Hours of Instruction	100	110
Additional Course Information	Prerequisite: Physical Sciences 436 or its equivalent. Credits awarded for Chemistry 534 can be applied toward a Secondary School Diploma (SSD). Chemistry 534 is a prerequisite for admission to certain general and technical education programs at the CEGEP-level. Students must complete a ministry prepared exam worth 50% of their final mark. The exam consists of classroom and laboratory work. The partial summative evaluation carried out by the teacher accounts for the remaining 50% of the mark. Students must achieve an average mark of 60% to pass the course.	Prerequisite: Chemistry, Grade 11, University Preparation SCH3U
Course Description	By learning about the scientific method, students will gain a better understanding of the behaviour of gases; chemical dynamics and energy transfers involved in chemical reactions; chemical equilibrium and oxidation-reduction and establish links with related technical phenomena, social changes, and environmental consequences.	This course enables students to deepen their understanding of chemistry through the study of organic chemistry, energy changes and rates of reaction, chemical systems and equilibrium, electrochemistry, and atomic and molecular structure. Students will further develop problem-solving and laboratory skills as they investigate chemical processes, at the same time refining their ability to communicate scientific information. Emphasis will be placed on the importance of chemistry in daily life, and on evaluating the impact of chemical technology on the environment.
Strands/Major Concepts	Research Gases and their Applications Chemical Reactions: Energy Chemical Reactions: Dynamics Chemical Reactions: Equilibrium and Oxidation Reduction	Organic Chemistry Energy Changes and Rates of Reaction Chemical Systems and Equilibrium Electrochemistry Structure and Properties
Overall Comparison	There is a considerable relationship between the two courses. Two major topics in Ontario Organic Chemistry and Structure and Properties are not taught in Chemistry 534 in Quebec. Overall Expectations in Chemistry, Grade 12 (SCH4U) NOT found in the Quebec course: Organic Chemistry <ul style="list-style-type: none"> demonstrate an understanding of the structure of various organic compounds, and of chemical reactions involving these compounds; investigate various organic compounds through research and experimentation, predict the products of organic reactions, and name and represent the structures of organic compounds using the IUPAC system and molecular models; evaluate the impact of organic compounds on our standard of living and the environment. Structure and Properties <ul style="list-style-type: none"> demonstrate an understanding of quantum mechanical theory, and explain how types of chemical bonding account for the properties of ionic, molecular, covalent network, and metallic substances; describe products and technologies whose development has depended on understanding molecular structure, and technologies that have advanced the knowledge of atomic and molecular theory. 	
Additional Comments	In Quebec, secondary school offers five years of general education, divided into two cycles. Cycle One, which lasts three years, enables students to consolidate the learning acquired in elementary school and to begin to think about their career options. From the third year on, optional subjects are added to the general curriculum, giving students the opportunity to explore various subject areas (sciences, arts, etc.). At the end of the fifth year of secondary education, students are awarded a Secondary School Diploma (SSD) that provides access to college, but does not lead directly to university. College education constitutes an intermediary level between compulsory secondary education and university education. Colleges (CEGEPs) offer two-year pre-university programs and three-year technical programs leading to a Diploma of College Studies (DCS) as well as shorter technical programs leading to an Attestation of College Studies (ACS). A Diploma of College Studies (DCS) is required for admission to university.	
Opportunity for Additional Credits	The Tools and Methods in Science (TMS 532) program was primarily developed to be integrated into learning situations developed for other Secondary IV and V science programs, especially Physics 534 and Chemistry 534. In this two credit (50 hour) optional program, students become familiar with the tools and methods of science as they investigate various phenomena in their environment and gain additional preparation for CEGEP – level science courses.	

	Quebec	Ontario
Course Name	Physics 534 (PHS-5041-2, PHS-5042-2, PHS-5043-2)	Physics, Grade 11, University Preparation SPH3U
Date of Curriculum	1992. Revised curriculum for implementation in 2009.	2000
Hours of Instruction	100	110
Additional Course Information	Prerequisite: Physical Sciences 436 Credits awarded for Physics 534 can be applied toward a Secondary School Diploma (SSD). Intended to prepare students for CEGEP-level Pure and Applied or Health Sciences concentrations. Students must complete a ministry prepared exam worth 50% of their final mark. The exam consists of classroom and laboratory work. The partial summative evaluation carried out by the teacher accounts for the remaining 50% of the mark. Students must achieve an average mark of 60% to pass the course.	Prerequisite: Grade 10 Science, Academic
Course Description	The Discovery of Matter and Energy contains three compulsory modules, the second of which requires students to carry out a research project. Investigating optical phenomena has become a modern technological challenge. The invention of the laser in the 1950s captured the interests of scientists, industry, and the medical field. In addition, every area of human activity has felt the influence of fibre-optic technology. The ability to understand methods of investigating the nature of light will enable both future professional scientists and ordinary citizens to develop a more critical attitude towards technological developments. Designing, constructing, and using optical devices to measure phenomena such as forces, masses, energy transformations and the motion of objects or organisms calls for imagination and creativity, qualities necessary for the inventive scientists and technicians of tomorrow. The empirical approach to Mechanics emphasized in this program gives students the opportunity to examine mechanical phenomena and feel the effects of various forces (e.g. acceleration, thrust, pressure, heat energy), observe changes in the motion of objects, and relate their own experiences to what they have observed in the laboratory. As scientists, technicians and engineers, they will have to refine and use the very models that they will begin to construct in this module.	This course develops students' understanding of the basic concepts of physics. Students study the laws of dynamics and explore different kinds of forces, the quantification and forms of energy (mechanical, sound, light, thermal, and electrical), and the way energy is transformed and transmitted. They develop scientific-inquiry skills as they verify accepted laws and solve both assigned problems and those emerging from their investigations. Students analyse the interrelationships between physics and technology, and consider the impact of technological applications of physics on society and the environment.
Strands/Major Concepts	The Nature of Light Optical Devices Mechanics	Forces and Motion Energy, Work and Power Waves and Sound Light and Geometric Optics Electricity and Magnetism
Overall Comparison	There is a considerable relationship between the two courses. Overall Expectations in Physics, Grade 11 (SPH3U) NOT found in the Quebec course: Electricity and Magnetism <ul style="list-style-type: none"> • Demonstrate an understanding of the properties, physical quantities, principles, and laws related to electricity, magnetic fields, and electromagnetic induction; • Carry out experiments or simulations, and construct a prototype device, to demonstrate characteristic properties of magnetic fields and electromagnetic induction • Identify and describe examples of domestic and industrial technologies that were developed on the basis of scientific understanding of magnetic fields. Waves and Sound <ul style="list-style-type: none"> • demonstrate an understanding of the properties of mechanical waves and sound and the principles underlying the production, transmission, interaction, and reception of mechanical waves and sound; • investigate the properties of mechanical waves and sound through experiments or simulations, and compare predicted results with actual results; • describe and explain ways in which mechanical waves and sound are produced in nature, and evaluate the contributions to entertainment, health, and safety of technologies that make use of mechanical waves and sound. 	
Opportunity for Additional Credits	The Tools and Methods in Science (TMS 532) program was primarily developed to be integrated into learning situations developed for other Secondary IV and V science programs, especially Physics 534 and Chemistry 534. In this two credit (50 hour) optional program, students become familiar with the tools and methods of science as they investigate various phenomena in their environment and gain additional preparation for CEGEP-level science courses.	

	Quebec	Ontario
Course Name	General Biology 534	Biology, Grade 12, University Preparation SBI4U
Date of Curriculum	1988. Revised curriculum for implementation in 2009.	2000
Hours of Instruction	100	110
Additional Course Information	Prerequisite: Physical Sciences 436 Credits awarded for Biology 534 can be applied toward a Secondary School Diploma (SSD). General Biology 534 prepares students for compulsory and/or optional CEGEP-level courses such as Biology 301 or 401. Students must achieve an average mark of 60% to pass the course.	Prerequisite: Biology, Grade 11, University Preparation SBI3U
Course Description	The General Biology program, which revolves around a unifying theme (i.e. Life: A Matter of Balance), focuses on the basic structures and mechanisms which ensure maintenance in living things. This program is intended to help Secondary IV or V students increase their knowledge of science by studying biological phenomena as well as their effects on society. Students examine topics using an approach which enables them to increase their knowledge of science by: <ul style="list-style-type: none"> • developing knowledge of biological facts; • discovering the ways in which this knowledge has evolved throughout history (successes, stumbling blocks, mistakes, setbacks, gaps); • discovering the relationships that exist among knowledge, technology and society; • perfecting their work methods and their ability to reason. 	This course provides students with the opportunity for in-depth study of the concepts and processes associated with biological systems. Students will study theory and conduct investigations in the area of metabolic processes, molecular genetics, homeostasis, evolution, and population dynamics. Emphasis will be placed on achievement of the detailed knowledge and refined skills needed for further study in various branches of the life sciences and related fields.
Strands/Major Concepts	What is Life <ul style="list-style-type: none"> • A Matter of Organization • A Matter of Continuity • A Matter of Energy • A Matter of Adaptation Balance in Nature <ul style="list-style-type: none"> • A Balanced Organism • A Stable Ecosystem Research Topics Skills and Attitudes	Metabolic Processes Molecular Genetics Homeostasis Evolution Population Dynamics
Overall Comparison	There is a strong relationship between the two courses. A major concept in Ontario of Molecular Genetics is not taught in General Biology 534 in Quebec. Overall Expectations in Biology, Grade 12 (SBI4U) NOT found in the Quebec course: Metabolic Processes <ul style="list-style-type: none"> • describe the structure and function of the macromolecules necessary for the normal metabolic functions of all living things, and the role of enzymes in maintaining normal metabolic functions; Molecular Genetics <ul style="list-style-type: none"> • explain the concepts of gene and gene expression and the roles of DNA, RNA, and chromosomes in cellular metabolism, growth, and division, and demonstrate an awareness of the universality of the genetic code; • explain, through laboratory activities and conceptual models, processes within the cell nucleus; • describe some of the theoretical issues surrounding scientific research into genetic continuity; • the general impact and philosophical implications of the knowledge gained; and some of the issues raised by related technological applications 	

	Quebec	Ontario
Course Name	Geology 552 – 534 Cycle Two (Grade 10 & 11)	Earth and Space Science, Grade 12, University Preparation SES4U
Date of Curriculum	1987	2000
Hours of Instruction	100	110
Additional Course Information	Prerequisite: Not specified. It is an optional course for students who are interested in Geology. Counts as credit for a Secondary School Diploma. (to be replaced in 2008-09) This course provides additional background for college level science courses.	Prerequisite: Grade 10 Science, Academic
Course Description	Geology plays an increasingly important role in today's world and economy. Consequently, the intention of this optional course is to enrich the students' scientific knowledge by helping them to develop an awareness of certain geological phenomena related to their immediate environment, using a method which is similar to that applied by geologists. The purpose of this course, in line with the afore-mentioned objective, is to provide the type of learning content that will help students: <ul style="list-style-type: none"> • to acquire the basic concepts related to geomorphology, petrology, stratigraphy, global tectonics and the natural resources found in their immediate environment; • to gradually acquire a work approach by applying the geological method to explore the various natural phenomena encountered in their geological environment; • to develop a sense of responsibility and a critical spirit regarding the use of geological resources for their personal benefit and for the benefit of humankind. 	This course focuses on the Earth as a planet, and on the basic concepts and theories of Earth science and their relevance to everyday life. Students will examine the Earth's place in the solar system and, after a general introduction to Earth science, will explore in more detail the materials of the Earth, its internal and surficial processes, and its history. The course draws on astronomy, biology, chemistry, mathematics, and physics in its consideration of geological processes that can be observed directly or inferred from other evidence.
Strands/Major Concepts	Geology 552-534 consists of five modules: Geomorphology Petrology Stratigraphy Global Tectonics Natural Resources	The Earth as a Planet Introduction to Earth Sciences Earth Materials Internal and Superficial Earth Processes Earth History
Overall Comparison	There is a strong relationship between these two courses. The geology information is very similar to the Ontario course but there is no mention of aspects of the Earth as a planet in the solar system or other planet's geology in the Quebec curriculum.	

	Quebec	Ontario
Course Name	Physical Science 416 (Cycle Two – Grade 10, 11)	Science, Grade 11, Workplace Preparation SNC3E
Date of Curriculum	1990	2000
Hours of Instruction	150	110
Additional Course Information	Prerequisite: Not specified (revision to be implemented in 2008-09). A core course required for a Secondary School Diploma.	
Course Description	<p>Physics and chemistry programs should help students develop scientific and technological abilities for a world in which these skills are synonymous with development. These disciplines have had a significant effect on different aspects of our existence, as evidenced by the role they have played in the fight against acid precipitation, in the development of energy sources, recycling techniques, and superconductive materials, and in the use of isotopes. Thus, there is no doubt that they should become part of a student's basic education, since this will be the last time that most students will ever study these subjects.</p> <p>It is also important to help students acquire basic scientific knowledge so that they can better understand the issues arising from the interrelationship of science, technology, society and the environment. Through the study of chemical and physical phenomena, students should become familiar with the practical implications of scientific work.</p> <p>If students are afforded the opportunity to develop genuine scientific attitudes and the skills related to scientific inquiry, they will not only acquire a greater understanding of various types of physical phenomena in their environment, but also be able to live in greater harmony with that environment. The teacher should encourage students to develop a better understanding of their place in the world and to question a whole range of prejudices with a view to making them aware of the importance to environmental protection and resource conservation.</p>	<p>This course provides students with the science-related knowledge and skills they need to help them make informed decisions in the workplace and in their personal lives. Students will explore a range of topics, including materials and safety; electrical circuits; micro-organisms; the human immune system and defences against disease; and the impact of humans on the environment. Emphasis is placed on relating these topics directly to students' experiences both in the world of work and in daily life.</p>
Strands/Major Concepts	<p>The Science course focuses on The Discovery of Matter and Energy and consists of 3 compulsory modules:</p> <ul style="list-style-type: none"> • Properties and Structure • Electrical Phenomena • Ionic Phenomena <p>Other enrichment and optional objectives are determined by the school.</p>	<p>Materials and Safety Electrical Circuits Micro-organisms The Immune System and Human Health Human Impact on the Environment</p>
Assessment/Evaluation	<p>Science 416 leads to a Secondary School Diploma the pass mark is 60%. A Laboratory Examination is 15% of the final mark. Schools may create their own Lab Exam or use the Ministry version. Either 2 or 3 lab exams are used over the year to address the 3 key strands in Physical Science 416-436. Students must write a 2-hour examination set by the Minister of Education.</p>	
Overall Comparison	<p>There is a very limited relationship between these two courses. The Immune System and Human Health and Human Impact on the Environment are not treated in the Quebec courses. Materials and Safety and Electrical Circuits are only partially covered under the sections on Properties and Structure and Ionic Phenomena. The aspects of the nature of science, the scientific method and the nature of science are treated thoroughly.</p>	

	Quebec	Ontario
Course Name	Physical Science 416 (Cycle Two – Grade 10, 11)	Science, Grade 11, University/College Preparation SNC3M
Date of Curriculum	1990	2000
Hours of Instruction	150	110
Additional Course Information	Prerequisite: Not specified. (revision to be implemented in 2008-09) A core course required for a Secondary School Diploma.	Prerequisite Grade 10 Science, Academic or Applied.
Course Description	<p>Physics and chemistry programs should help students develop scientific and technological abilities for a world in which these skills are synonymous with development. These disciplines have had a significant effect on different aspects of our existence, as evidenced by the role they have played in the fight against acid precipitation, in the development of energy sources, recycling techniques, and superconductive materials, and in the use of isotopes. Thus, there is no doubt that they should become part of a student's basic education, since this will be the last time that most students will ever study these subjects.</p> <p>It is also important to help students acquire basic scientific knowledge so that they can better understand the issues arising from the interrelationship of science, technology, society and the environment. Through the study of chemical and physical phenomena, students should become familiar with the practical implications of scientific work.</p> <p>If students are afforded the opportunity to develop genuine scientific attitudes and the skills related to scientific inquiry, they will not only acquire a greater understanding of various types of physical phenomena in their environment, but also be able to live in greater harmony with that environment. The teacher should encourage students to develop a better understanding of their place in the world and to question a whole range of prejudices with a view to making them aware of the importance to environmental protection and resource conservation.</p>	<p>This course enables students, including those who do not intend to pursue science-related programs at the postsecondary level, to increase their understanding of science and its technological applications. Students will explore a range of topics, including the safe use of everyday chemicals; the science of nutrition and body function; waste management; the application of scientific principles in space; and technologies in everyday life. Emphasis will be placed on the role of science and technology in daily life and in relation to social and environmental issues.</p>
Strands/Major Concepts	<p>The Science course focuses on The Discovery of Matter and Energy and consists of 3 compulsory modules:</p> <ul style="list-style-type: none"> • Properties and Structure • Electrical Phenomena • Ionic Phenomena <p>Other enrichment and optional objectives are determined by the school.</p>	<p>Everyday Chemicals and Safe Practices Body Input and Body Function Waste Management Science and Space Technologies in Everyday Life</p>
Assessment/Evaluation	<p>Science 416-436 leads to a Secondary School Diploma the pass mark is 60%.</p> <p>A Laboratory Examination is 15% of the final mark. Schools may create their own Lab Exam or use the Ministry version. Either 2 or 3 lab exams are used over the year to address the 3 key strands in Physical Science 416-436. Students must write a 2-hour examination set by the Minister of Education.</p>	
Overall Comparison	<p>There is a very limited relationship between these two courses. Body Input and Body Function, Waste Management, and Science and Space are not treated in the Quebec course. Everyday Chemicals and Safe Practice is only partially covered under the section on Ionic Phenomena and some aspects of Technologies in Everyday Life are treated throughout various components of the Quebec curriculum. The aspects of the nature of science, the scientific method and the nature of science are treated thoroughly.</p>	
Additional Comments	<p>Note: Science 416 is intended for non-science major students and there is also a Science 436 which is intended for science major students. The content is similar in that the core curriculum is the same but there is additional supplementary content in the 436 course that prepares students to take Chemistry and Physics courses.</p>	

	Quebec	Ontario
Course Name	Tools and Methods of Science 532 (TMS 532) (Cycle Two – Grade 10, 11)	Science, Grade 11, University/College Preparation SNC3M
Date of Curriculum	1992	2000
Hours of Instruction	50	110
Additional Course Information	Prerequisite: Not a stand alone course, intended to be integrated into other Secondary IV or V courses. Chemistry 534, Physics 534, General Biology 534, Geology 534 or Science 416-436 Provides additional background for CEGEP (college) or University level science courses. It is an optional course that may be counted towards a Secondary School Diploma (to be replaced in 2008-09).	Prerequisite Grade 10 Science, Academic or Applied.
Course Description	In this program, students become familiar with natural and technological phenomena through learning situations that they themselves propose or that are suggested by the teacher. This course was primarily designed to be integrated into learning situations developed for the other Secondary IV and V science programs. <i>TMS 532</i> helps students to: <ul style="list-style-type: none"> • learn how to make better use of tools and methods useful for scientific work • learn how to make better use of instruments and materials that help scientists and technologists do their work • learn about the concept of a model • learn about the nature of science itself The students should construct this learning content and develop their skills and attitudes through learning situations in which they can investigate their environment by means of the scientific method and examine the relationships between science, technology, and society.	This course enables students, including those who do not intend to pursue science-related programs at the postsecondary level, to increase their understanding of science and its technological applications. Students will explore a range of topics, including the safe use of everyday chemicals; the science of nutrition and body function; waste management; the application of scientific principles in space; and technologies in everyday life. Emphasis will be placed on the role of science and technology in daily life and in relation to social and environmental issues.
Strands/Major Concepts	The Science course consists of 2 modules: <ul style="list-style-type: none"> • Research Project • Tools and Methods Used in Research Work 	Everyday Chemicals and Safe Practices Body Input and Body Function Waste Management Science and Space Technologies in Everyday Life
Overall Comparison	There is a very limited relationship between these two courses. This Quebec course does not treat 4 of the Ontario strands at all. Everyday Chemicals and Safe Practices, Body Input and Body Function, Waste Management, and Science and Space are not treated at all. Some aspects of Technologies in Everyday Life are treated throughout various components of the Quebec curriculum and in more detail here. The aspects of the nature of science, the scientific method and the nature of science are treated thoroughly. This course provides a strong support for the STSE emphasis in the Ontario curriculum and for the scientific investigation skills that are highlighted at the start of all senior science courses.	