



**TFS High School**  
**COURSE OUTLINE**  
**Mathematics, Grade 9 (MTH1W)**

<b>Ministry of Education Course Title</b>	Grade 9 De-streamed Mathematics
<b>Instructor</b>	Ms. Maliheh Mohseni
<b>Developed Date</b>	2021
<b>Ministry Course Code</b>	MTH1W
<b>Course Type</b>	De-Streamed
<b>Credit Value</b>	1.00
<b>Ministry Curriculum Document</b>	<a href="https://www.dcp.edu.gov.on.ca/en/curriculum/secondary-mathematics/courses/mth1w">MTH1W Grade 9 Mathematics</a> <a href="https://www.dcp.edu.gov.on.ca/en/curriculum/secondary-mathematics/courses/mth1w">https://www.dcp.edu.gov.on.ca/en/curriculum/secondary-mathematics/courses/mth1w</a>
<b>Prerequisites</b>	None
<b>Course Revision Date (TFS)</b>	November 2021
<b>Most Recent Revised Date</b>	August 2023
<b>Hours</b>	110

This course has been developed based on the following Ministry documents:

1. The Ontario Curriculum, Gr 9 DE streamed Mathematics 2021
2. Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools (2010)

### Course Description:

This course enables students to consolidate, and continue to develop, an understanding of mathematical concepts related to number sense and operations, algebra, measurement, geometry, data, probability, and financial literacy. Students will use mathematical processes, mathematical modelling, and coding to make sense of the mathematics they are learning and to apply their understanding to culturally responsive and relevant real-world situations. Students will continue to enhance their mathematical reasoning skills, including proportional reasoning, spatial reasoning, and algebraic reasoning, as they solve problems and communicate their thinking.

<b>Unit Titles and Descriptions</b>	<b>Time and Sequence</b>
<b>Numbers</b>  This unit will expand on the use of fractions, ratios, rates, proportions, and number sets, as well as introduce the rules for working with exponents. Students will also be introduced to abstract concepts like infinite sets and limits of a pattern.	20 hours
<b>Algebra and Coding</b>  This unit will focus on setting the foundations for working with linear relationships. Students will investigate the properties of linear and non-linear relationships, the different representations of linear relationships, and solve theoretical and application problems involving linear relationships. The unit will also connect algebraic concepts to coding applications. Students will read and write pseudocode, making use of comparative statements and loops, that produces solutions to real-life problems. expressions	26 hours
<b>Data</b>  This unit will expand on the foundations of data collection and data analysis and build toward a project where students conduct a survey and analyze their data. Students will create a mathematical model for their data and test its validity.	20 hours
<b>Geometry and Measurement</b>  This unit explores variety of measurement systems and introduces the factor label method for converting between different unit types. Students will also investigate geometric relationships such as the volume differences between pyramids and prisms as well as cones and cylinders.	20 hours

<p><b>Financial Literacy</b></p> <p>Demonstrate the knowledge and skills needed to make informed financial decisions. This unit will build on the idea of compound interest and students will learn about models of appreciation and depreciation in a Canadian context. Students will also learn methods to adapt a budget so that it continues to work under moderate changes in circumstances.</p>	19 hours
<p><b>Final Exam &amp; Culminating Activity</b></p> <p>The final assignment and final exam will include all material learned throughout the entire course and will make up the culminating portion of the final mark.</p>	5 hours
<p><b>Total</b></p>	110 hours

## OVERALL AND SPECIFIC EXPECTATIONS

### **STRAND AA: Social-Emotional Learning (SEL) Skills in Mathematics**

Throughout this course, in the context of learning related to the other strands, students will:

AA1. Develop and explore a variety of social-emotional learning skills in a context that supports and reflects this learning in connection with the expectations across all other strands

This overall expectation is to be included in classroom instruction, but not in assessment, evaluation, or reporting. See further information about approaches to instruction that support all students as they work to apply mathematical thinking, make connections, and develop healthy identities as mathematics learners to foster well-being and the ability to learn mathematics.

### **STRAND A: Mathematical Thinking and Making Connections**

Throughout this course, in connection with the learning in the other strands, students will:

A1. Apply the mathematical processes to develop a conceptual understanding of, and procedural fluency with, the mathematics they are learning

A2. Make connections between mathematics and various knowledge systems, their lived experiences, and various real-life applications of mathematics, including careers

This strand has no specific expectations. Students' learning related to this strand takes place in the context of learning related to strands B through F, and it should be assessed and evaluated within these contexts.

## **STRAND B: Number**

demonstrate an understanding of the development and use of numbers, and make connections between sets of numbers.

- represent numbers in various ways, evaluate powers, and simplify expressions by using the relationships between powers and their exponents.
- apply an understanding of rational numbers, ratios, rates, percentages, and proportions, in various mathematical contexts, and to solve problems.

*By the end of this course, students will:*

**B1. Demonstrate an understanding of the development and use of numbers, and make connections between sets of numbers**

### *Development and Use of Numbers*

**B1.1** research a number concept to tell a story about its development and use in a specific culture, and describe its relevance in a current context

### *Number Sets*

**B1.2** describe how various subsets of a number system are defined, and describe similarities and differences between these subsets

**B1.3** use patterns and number relationships to explain density, infinity, and limit as they relate to number sets

**B2.** Represent numbers in various ways, evaluate powers, and simplify expressions by using the relationships between powers and their exponents

### *Powers*

**B2.1** analyses, through the use of patterning, the relationship between the sign and size of an exponent and the value of a power, and use this relationship to express numbers in scientific notation and evaluate powers

**B2.2** analyses, through the use of patterning, the relationships between the exponents of powers and the operations with powers, and use these relationships to simplify numeric and algebraic expressions

**B3.** Apply an understanding of rational numbers, ratios, rates, percentages, and proportions, in various mathematical contexts, and to solve problems

### *Rational Numbers*

**B3.1** apply an understanding of integers to describe location, direction, amount, and changes in any of these, in various contexts

**B3.2** apply an understanding of unit fractions and their relationship to other fractional amounts, in various contexts, including the use of measuring tools

**B3.3** apply an understanding of integers to explain the effects that positive and negative signs have on the values of ratios, rates, fractions, and decimals, in various contexts

### *Applications*

**B3.4** solve problems involving operations with positive and negative fractions and mixed numbers, including problems involving formulas, measurements, and linear relations, using technology when appropriate

**B3.5** pose and solve problems involving rates, percentages, and proportions in various contexts, including contexts connected to real-life applications of data, measurement, geometry, linear relations, and financial literacy

## **STRAND C: Algebra**

- demonstrate an understanding of the development and use of algebraic concepts and of their connection to numbers, using various tools and representations.
- apply coding skills to represent mathematical concepts and relationships dynamically, and to solve problems, in algebra and across the other strands.
- represent and compare linear and non-linear relations that model real-life situations, and use these representations to make predictions.
- demonstrate an understanding of the characteristics of various representations of linear and non-linear relations, using tools, including coding when appropriate.

### *By the end of this course, students will:*

**C1.** Demonstrate an understanding of the development and use of algebraic concepts and of their connection to numbers, using various tools and representations

### *Development and Use of Algebra*

**C1.1** research an algebraic concept to tell a story about its development and use in a specific culture, and describe its relevance in a current context

### *Algebraic Expressions and Equations*

**C1.2** create algebraic expressions to generalize relationships expressed in words, numbers, and visual representations, in various contexts

**C1.3** Compare algebraic expressions using concrete, numerical, graphical, and algebraic methods to identify those that are equivalent, and justify their choices

**C1.4** simplify algebraic expressions by applying properties of operations of numbers, using various representations and tools, in different contexts

**C1.5** Create and solve equations for various contexts, and verify their solutions

**C2.** Apply coding skills to represent mathematical concepts and relationships dynamically, and to solve problems, in algebra and across the other strands

### ***Coding***

The unit will also connect algebraic concepts to coding applications. Students will read and write pseudocode, making use of comparative statements and loops, that produces solutions to real-life problems. expressions

**C2.1** use coding to demonstrate an understanding of algebraic concepts including variables, parameters, equations, and inequalities

**C2.2** create code by decomposing situations into computational steps in order to represent mathematical concepts and relationships, and to solve problems

**C2.3** read code to predict its outcome, and alter code to adjust constraints, parameters, and outcomes to represent a similar or new mathematical situation

**C3.** represent and compare linear and non-linear relations that model real-life situations, and use these representations to make predictions

### ***Application of Linear and Non-Linear Relations***

**C3.1** compare the shapes of graphs of linear and non-linear relations to describe their rates of change, to make connections to growing and shrinking patterns, and to make predictions

**C3.2** represent linear relations using concrete materials, tables of values, graphs, and equations, and make connections between the various representations to demonstrate an understanding of rates of change and initial values

**C3.3** compare two linear relations of the form  $y = ax + b$  graphically and algebraically, and interpret the meaning of their point of intersection in terms of a given context

**C4.** Demonstrate an understanding of the characteristics of various representations of linear and non-linear relations, using tools, including coding when appropriate Characteristics of Linear and Non-Linear Relations

**C4.1** compare characteristics of graphs, tables of values, and equations of linear and non-linear relations

**C4.2** graph relations represented as algebraic equations of the forms  $x = k$ ,  $y = k$ ,  $x + y = k$ ,  $x - y = k$ ,  $ax + by = k$ , and  $xy = k$ , and their associated inequalities, where  $a$ ,  $b$ , and  $k$  are constants, to identify various characteristics and the points and/or regions defined by these equations and inequalities

**C4.3** translate, reflect, and rotate lines defined by  $y = ax$ , where  $a$  is a constant, and describe how each transformation affects the graphs and equations of the defined lines

**C4.4** determine the equations of lines from graphs, tables of values, and concrete representations of linear relations by making connections between rates of change and slopes, and between initial values and  $y$ -intercepts, and use these equations to solve problems

## **STRAND D: Data**

describe the collection and use of data, and represent and analyse data involving one and two variables; • apply the process of mathematical modelling, using data and mathematical concepts from other strands, to represent, analyse, make predictions, and provide insight into real-life situations.

***By the end of this course, students will:***

**D1.** Describe the collection and use of data, and represent and analyse data involving one and two variables

### ***Application of Data***

**D1.1** Identify a current context involving a large amount of data, and describe potential implications and consequences of its collection, storage, representation, and use Representation and Analysis of Data

**D1.2** Represent and statistically analyse data from a real-life situation involving a single variable in various ways, including the use of quartile values and box plots

**D1.3** create a scatter plot to represent the relationship between two variables, determine the correlation between these variables by testing different regression models using technology, and use a model to make predictions when appropriate

**D2.** Apply the process of mathematical modelling, using data and mathematical concepts from other strands, to represent, analyse, make predictions, and provide insight into real-life situations

### ***Application of Mathematical Modelling***

**D2.1** describe the value of mathematical modelling and how it is used in real life to inform decisions

### ***Process of Mathematical Modelling***

**D2.2** Identify a question of interest requiring the collection and analysis of data, and identify the information needed to answer the question

**D2.3** create a plan to collect the necessary data on the question of interest from an appropriate source, identify assumptions, identify what may vary and what may remain the same in the situation, and then carry out the plan

**D2.4** determine ways to display and analyse the data in order to create a mathematical model to answer the original question of interest, taking into account the nature of the data, the context, and the assumptions made

**D2.5** report how the model can be used to answer the question of interest, how well the model fits the context, potential limitations of the model, and what predictions can be made based on the model

## **STRAND E: Geometry and Measurement**

demonstrate an understanding of the development and use of geometric and measurement relationships, and apply these relationships to solve problems, including problems involving real-life situations.

***By the end of this course, students will:***

**E1.** Demonstrate an understanding of the development and use of geometric and measurement relationships, and apply these relationships to solve problems, including problems involving real-life situations

### ***Geometric and Measurement Relationships***

**E1.1** Research a geometric concept or a measurement system to tell a story about its development and use in a specific culture or community, and describe its relevance in connection to careers and to other disciplines

**E1.2** Create and analyse designs involving geometric relationships and circle and triangle properties, using various tools

**E1.3** solve problems involving different units within a measurement system and between measurement systems, including those from various cultures or communities, using various representations and technology, when appropriate

**E1.4** show how changing one or more dimensions of a two-dimensional shape and a three-dimensional object affects perimeter/circumference, area, surface area, and volume, using technology when appropriate

**E1.5** solve problems involving the side-length relationship for right triangles in real-life situations, including problems that involve composite shapes

**E1.6** solve problems using the relationships between the volume of prisms and pyramids and between the volume of cylinders and cones, involving various units of measure

## **STRAND F: Financial Literacy**

- demonstrate the knowledge and skills needed to make informed financial decisions.

***By the end of this course, students will:***

### **F1. Demonstrate the knowledge and skills needed to make informed financial decisions**

#### ***Financial Decisions***

**F1.1 identify** a past or current financial situation and explain how it can inform financial decisions, by applying an understanding of the context of the situation and related mathematical knowledge

**F1.2** identify financial situations that involve appreciation and depreciation, and use associated graphs to answer related questions

**F1.3** compare the effects that different interest rates, lengths of borrowing time, ways in which interest is calculated, and amounts of down payments have on the overall costs associated with purchasing goods or services, using appropriate tools

**F1.4** modify budgets displayed in various ways to reflect specific changes in circumstances, and provide a rationale for the modifications



## Teaching / Learning Strategies:

### Whole-Class Activities (facilitated through discussion forums)

Whole class activities are designed to introduce concepts and skills that are directly applicable to build on the content being studied during small group and individual activities.

These activities include the following:

**Class discussions:** that are facilitated through video conferencing through zoom platform with their subject teacher or discussions with other students concerning the concepts and skills being studied.

**Video presentations** and technological aids (research) with videos embedded to enrich the course content and clarify concepts and skills being studied. Also the use of online pre-approved quizzes and games to help a student become more familiar with the concepts and skills being studied.

**Diagnostic and review activities** (audio and video taping) can be student-lead or teacher lead to work as a review for students through audio and video made to share among each other to help reinforce the concepts and skills being studied.

**Brainstorming, charts and graphs** are a great way for students to demonstrate their knowledge of subject matter through graphic organizers, pictures, and texts. This is communicated through assignments in zoom platform.

### Individual Activities

The teacher should provide a variety of individual assignments to expand and consolidate the learning that takes place in the whole-class and small group activities. Individual activities allow the teacher to accommodate interests and needs and to access the progress of individual students. The teacher plays an important role in supporting these activities through the provision of ongoing feedback to the students, both orally and in writing through google classroom . Teachers are encouraged to include individual activities such as the following in the course:

**Individual assignments** are worked on at a student's own pace. The teacher can support the student in these activities with ongoing feedback.

**Oral presentations** are facilitated through the use of video conferencing and video recording.

**Practical extension and application of knowledge** helps students develop their own voice, and gives them the ability to make personal connections, and connections to the world throughout their course. Students are given a variety of reading and viewing texts to give them many chances to apply their new concepts, skills, and knowledge.

**Reading** students are able to read material online. The students may print out the reading material to use it to highlight, take notes, and have with them when a computer is not available.

**Written assignments** are used to allow students to develop their skills in writing, comprehension, and communication. With the online format students submit their work, and have a chance to get feedback from the teacher, and submit their best work. This can be demonstrated with reading responses, personal writing, report writing, essay writing, script writing, business and technical writing, and individual research assignments.

All course material is online, no textbook is required. Assignments are submitted electronically. Tests are completed online at a time convenient for the student, and the course ends in a final exam which the student writes at a predetermined time and place. Students must achieve the Ministry of Education learning expectations of a course and complete 110 hours of planned learning activities, both online and offline, in order to earn a course credit. Students must keep a learning log throughout their course which outlines the activities they have completed and their total learning hours. This log must be submitted before the final exam can be written.

The chart below indicates some general examples of online and offline activities. Online Learning Activities Offline Learning Activities

### Online Learning Activities

Watching instructional videos

Watching additional resources videos

Completing online timed assignments

Completing assignments

Uploading presentations

### Offline Learning Activities

Reading materials for course

studying instructional material

practicing skills

completing essays

Communicating with instructor

Preparing presentations

Participating in live conferences

Reviewing for tests and exams

Practicing through online quizzes

Researching topics on internet

Reviewing peer submissions

Assessing peer presentations

Completing online timed exam

Assessment is a systematic process of collecting information or evidence about student learning. Evaluation is the judgment we make about the assessments of student learning based on established criteria. The purpose of assessment is to improve student learning. This means that judgments of student performance must be criterion-referenced so that feedback can be given that includes clearly expressed next steps for improvement. Tools of varying complexity are used by the teacher to facilitate this. For the more complex evaluations, the criteria are incorporated into a rubric where levels of performance for each criterion are stated in language that can be understood by students

### **Assessment and Evaluation Strategies of Student Performance based on Growing Success**

Strategy	Purpose	Who	Assessment Tool
Self Assessment Quizzes	Assessment For Learning	Self/Teacher	Marking scheme
Problem Solving	Assessment As Learning	Self/Peer/Teacher	Marking scheme
Graphing Application	Assessment For Learning	Self	Anecdotal records
Problem Solving	Assessment As Learning	Peer/teacher	Marking scheme
Research	Assessment For Learning	Peer/teacher	Anecdotal records
Problem Solving	Assessment OF Learning	Teacher	Marking scheme
Graphing	Assessment As Learning	Teacher	Checklist
Investigations	Assessment OF Learning/ Evaluation	Teacher	Checklist
Unit Tests	Assessment OF Learning/ Evaluation	Teacher	Marking scheme
Final Exam	Assessment OF Learning/ Evaluation	Teacher	Checklist

Percentage of Final Mark	Weight	Evaluation Categories	Assessment will be ongoing to inform the students of their performance and the opportunity for success. Four achievement categories are illustrated in the chart.
70%	60%	Tests and Quizzes	
	10%	Projects and Assignments	
30%	30%	Final Written Examination	

<b>K&amp;U</b>	<b>25%</b>
<b>Inquiry</b>	<b>25%</b>
<b>Communication</b>	<b>25%</b>
<b>Application</b>	<b>25%</b>

### TERM WORK EVALUATIONS (70%):

Evaluation Item	Description	Category
Problem sets	Problem sets supplement lessons and are used to assess whether or not students are meeting criteria for success	K,T,C,A
End of Unit Conversation	Unit reflection happens at the end of each unit for both student and teacher to reflect on their process and understanding in the unit.	K,T,C,A
Unit Quiz	Each unit has a short quiz on material covered up to the quiz.	K,T,C,A
Unit Assignment	Unit assignments are based on curriculum expectations and cover the entirety of each unit	K,T,C,A

### Resources required by students

*Note:* This course is entirely online and does not require nor rely on any textbook.

- A scanner, smart phone camera, or similar device to digitize handwritten or hand-drawn work,
- A non-programmable, non-graphing, scientific calculator,
- Spreadsheet software (e.g. Microsoft Excel, Apple Numbers, Google Sheets, or equivalent),
- Word processing software (e.g. Microsoft Word, Apple Pages, Google Docs, or equivalent),
- Graphing software (e.g. Desmos graphing calculator).

### Reference Texts

*Note:* This course is entirely online and does not require or rely on any textbook. Should students wish to seek additional information we would recommend these texts:

- Mathematics 9, McGraw-Hill Ryerson, 2008.
- Mathematics 9, Nelson Education Ltd., 2009

Students are expected to access and participate actively in course work and course forums on a regular and frequent basis. This interaction with other students is a major component of this course and there are minimum requirements for student communication and contribution.

## **Seven mathematical processes will form the heart of the teaching and learning strategies used.**

1. **Communicating:** To improve student success there will be several opportunities for students to share their understanding both in oral as well as written form.
2. **Problem solving:** Scaffolding of knowledge, detecting patterns, making and justifying conjectures, guiding students as they apply their chosen strategy, directing students to use multiple strategies to solve the same problem, when appropriate, recognizing, encouraging, and applauding perseverance, discussing the relative merits of different strategies for specific types of problems.
3. **Reasoning and proving:** Asking questions that get students to hypothesize, providing students with one or more numerical examples that parallel these with the generalization and describing their thinking in more detail.
4. **Reflecting:** Modeling the reflective process, asking students how they know.
5. **Selecting Tools and Computational Strategies:** Modeling the use of tools and having students use technology to help solve problems.
6. **Connecting:** Activating prior knowledge when introducing a new concept in order to make a smooth connection between previous learning and new concepts, and introducing skills in context to make connections between particular manipulations and problems that require them.
7. **Representing:** Modeling various ways to demonstrate understanding, posing questions that require students to use different representations as they are working at each level of conceptual development - concrete, visual or symbolic, allowing individual students the time they need to solidify their understanding at each conceptual stage.

## **Assessment and Evaluation**

Assessments and evaluations are based on the Ontario Ministry of Education's Growing Success 2010 document. Assessment is the process of gathering information that accurately reflects how well a student is achieving the curriculum expectations in a subject or course. The primary purpose of assessment is to improve student learning. Assessment for this purpose is seen as both "assessment for learning" and "assessment as learning". As part of assessment for learning, teachers provide students with descriptive feedback and coaching for improvement. Teachers engage in assessment as learning by helping all students develop their capacity to be independent, autonomous learners who are able to set individual goals, monitor their own progress, determine next steps, and reflect on their thinking and learning.

Using variety of sources in their assessment. These include formal and informal observations, discussions, conversations, questioning, assignments, projects, portfolios, self-assessments, self-reflections, essays, and tests.

Assessment occurs concurrently and seamlessly with instruction. Our courses contain multiple opportunities for students to obtain information about their progress and achievement, and to receive feedback that will help them improve their learning. Students can monitor their own success through the tracking of learning goals and success criteria throughout all courses.

Summative "assessment of learning" activities occur at or near the end of periods of learning. Evidence of student achievement for evaluation is also collected over time from different sources, such as discussions, conversations and observation of the development of the student's learning. Using multiple sources of evidence increases the reliability and validity of this evaluation. The evaluations are expressed as a percentage based upon the levels of achievement

## Achievement Chart: Mathematics, Grades 9-12

Categories	50-59% (Level 1)	60-69% (Level 2)	70-79% (Level 3)	80-100% (Level 4)
<b>Knowledge and Understanding</b> - Subject-specific content acquired in each course (knowledge), and the comprehension of its meaning and significance (understanding)				
	The student:			
<b>Knowledge of content</b> (e.g., facts, terms, procedural skills, use of tools)	demonstrates limited knowledge of content	demonstrates some knowledge of content	demonstrates considerable knowledge of content	demonstrates thorough knowledge of content
<b>Understanding of mathematical concepts</b>	demonstrates limited understanding of content	demonstrates some understanding of content	demonstrates considerable understanding of content	demonstrates thorough and insightful understanding of content
<b>Thinking</b> - The use of critical and creative thinking skills and/or processes				
	The student:			
<b>Use of planning skills</b> -understanding the problem (e.g., formulating and interpreting the problem, making conjectures) -making a plan for problem solving	uses planning skills with limited effectiveness	uses planning skills with moderate effectiveness	uses planning skills with considerable effectiveness	uses planning skills with a high degree of effectiveness
<b>Use of processing skills</b> -carrying out a plan (e.g., collecting data, questioning, testing, revising, modelling, solving, inferring, forming conclusions) -looking back at the solution (e.g., evaluating reasonableness, making convincing arguments, reasoning, justifying, proving, reflecting)	uses processing skills with limited effectiveness	uses processing skills with some effectiveness	uses processing skills with considerable effectiveness	uses processing skills with a high degree of effectiveness
<b>Use of critical/creative thinking processes</b> (e.g., problem solving, inquiry)	uses critical / creative thinking processes with limited effectiveness	uses critical / creative thinking processes with some effectiveness	uses critical / creative thinking processes with considerable effectiveness	uses critical / creative thinking processes with a high degree of effectiveness
<b>Communication</b> - The conveying of meaning through various forms				
	The student:			
<b>Expression and organization of ideas and mathematical</b>	expresses and organizes	expresses and organizes	expresses and organizes	expresses and organizes

<b>thinking</b> (e.g., clarity of expression, logical organization), <b>using oral, visual, and written forms</b> (e.g., pictorial, graphic, dynamic, numeric, algebraic forms; concrete materials)	mathematical thinking with limited effectiveness	mathematical thinking with some effectiveness	mathematical thinking with considerable effectiveness	mathematical thinking with a high degree of effectiveness
<b>Communication for different audiences</b> (e.g., peers and teachers) <b>and purposes</b> (e.g., to present data, justify a solution, express a mathematical argument) <b>in oral, visual, and written forms</b>	communicates for different audiences and purposes with limited effectiveness	communicates for different audiences and purposes with some effectiveness	communicates for different audiences and purposes with considerable effectiveness	communicates for different audiences and purposes with a high degree of effectiveness
<b>Use of conventions, vocabulary, and terminology of the discipline</b> (e.g., terms, symbols) <b>in oral, visual, and written forms</b>	uses conventions, vocabulary, and terminology of the discipline with limited effectiveness	uses conventions, vocabulary, and terminology of the discipline with some effectiveness	uses conventions, vocabulary, and terminology of the discipline with considerable effectiveness	uses conventions, vocabulary, and terminology of the discipline with a high degree of effectiveness
<b>Application</b> - The use of knowledge and skills to make connections within and between various contexts				
	The student:			
<b>Application of knowledge and skills in familiar contexts</b>	applies knowledge and skills in familiar contexts with limited effectiveness	applies knowledge and skills in familiar contexts with some effectiveness	applies knowledge and skills in familiar contexts with considerable effectiveness	applies knowledge and skills in familiar contexts with a high degree of effectiveness
<b>Transfer of knowledge and skills to new contexts</b>	transfers knowledge and skills to new contexts with limited effectiveness	transfers knowledge and skills to new contexts with some effectiveness	transfers knowledge and skills to new contexts with considerable effectiveness	transfers knowledge and skills to new contexts with a high degree of effectiveness
<b>Making connections within and between various contexts</b> (e.g., connections between concepts, representations, and forms within mathematics; connections involving use of prior knowledge and experience; connections between mathematics, other disciplines, and the real world))	makes connections within and between various contexts with limited effectiveness	makes connections within and between various contexts with some effectiveness	makes connections within and between various contexts with considerable effectiveness	makes connections within and between various contexts with a high degree of effectiveness

## Learning Skills:

Learning Skills are skills and habits essential to success in school and in the workplace. Teachers report achievement on the six Learning Skills in the table below using letter codes:

E = Excellent

G = Good

S = Satisfactory

N = Needs Improvement.

Learning Skills	Sample Behaviors
Responsibility	The student fulfils responsibilities and commitments within the learning environment; completes and submits class work, homework, and assignments according to agreed-upon timelines; takes responsibility for and manages own behavior.
Organization	The student devises and follows a plan and process for completing work and tasks; establishes priorities and manages time to complete tasks and achieve goals; identifies, gathers, evaluates, and uses information, technology, and resources to complete tasks.
Independent Work	The student independently monitors, assesses, and revises plans to complete tasks and meet goals; uses class time appropriately to complete tasks; follows instructions with minimal supervision.
Collaboration	The student accepts various roles and an equitable share of work in a group; responds positively to the ideas, opinions, values, and traditions of others; builds healthy peer-to-peer relationships through media-assisted interactions; works with others to resolve conflicts and build consensus to achieve group goals; shares information, resources, and expertise and promotes critical thinking to solve problems and make decisions.
Initiative	The student looks for and acts on new ideas and opportunities for learning; demonstrates the capacity for innovation and a willingness to take risks; demonstrates curiosity and interest in learning; approaches new tasks with a positive attitude; recognizes and advocates appropriately for the rights of self and others.
Self-Regulation	The student sets own individual goals and monitors progress towards achieving them; seeks clarification or assistance when needed; assesses and reflects critically on own strengths, needs, and interests; identifies learning opportunities, choices, and strategies to meet personal needs and achieve goals; perseveres and makes an effort when responding to challenges.

## Program Planning Consideration

Teachers who are planning a program in this subject will make an effort to take into account considerations for program planning that align with the Ontario Ministry of Education and initiatives in a number of important areas policy and initiatives in a number of important areas

1. Education for students with special education needs
2. Environmental education
3. Equity and inclusive education
4. Financial literacy education

5. Ontario First Nations, Metis, and Inuit education
6. Role of information and communications technology
7. English language learners
8. Career education
9. Cooperative education and other workplace experiences
10. Health and safety