

# Course Outline

School Name: Keewaytinook Internet High School

Department Name: Mathematics

Ministry of Education Course Title: Grade 10 Essentials Math (Locally Developed)

Grade Level: 10

Ministry Course Code: MAT2L

Teacher's Name: Erik Tu

Developed by: Erik Tu Date: August 2012

Revision Date: August 2017

Developed from: Locally Developed Compulsory Credit Courses - 2005

Text: N/A

Prerequisite: MAT1L, MFM1P, MFM1D

Credits: 1

Length: 110 hours

Principal's Name: Kevin Dempsey

Principal's Approval (signature):



Approval Date: September 11, 2017

## ***Course Description/Rationale***

This course emphasizes the extension of mathematical knowledge and skills to prepare students for success in their everyday lives, in the workplace, and in the Grade 11 and Grade 12 Mathematics Workplace Preparation courses.

The course is organized by three major strands related to money sense, measurement, and proportional reasoning. In all strands, the focus is on strengthening and extending key foundational mathematical concepts and skills by solving authentic, everyday problems.

Students have opportunities to extend their mathematical literacy and problem-solving skills and to continue developing their skills in reading, writing, and oral language through relevant and practical math activities.

## ***Overall Curriculum Expectations***

### **Extending Money Sense**

- solve problems drawn from everyday situations involving money, demonstrating skill and understanding in the use of decimal numbers;
- information about money sense;
- use literacy skills (reading, writing, listening, and speaking) to extend their money sense.

### **Extending Understanding Measurement**

- make estimates and measurements to extend understanding of the metric system;
- make estimates and measurements to extend understanding of the imperial system;
- solve problems involving measurements of circles, rectangles, cylinders, and rectangular prisms, using metric units in applications drawn from everyday life and the workplace;
- communicate information about measurement concepts;
- use literacy skills (reading, writing, listening, and speaking) to extend understanding of measurement.

### **Extending Understanding of Proportional Reasoning**

- solve problems drawn from everyday situations, demonstrating skill and understanding in the use of fractions, percentages, ratios, and rates;
- communicate information drawn from a variety of sources;
- use literacy skills (reading, writing, listening, and speaking) to extend understanding of proportional reasoning.

## ***Course Content***

Unit 1	Working for our money	31 hours
Unit 2	Metric VS Imperial	22 hours
Unit 3	Unlocking the Mysteries of Circles and building a model	23 hours
Unit 4	Proportional Reasoning	34 hours
	<b>TOTAL</b>	110 hours

## ***Unit Descriptions***

### **Unit 1 - Working for our Money**

In this unit, students think critically about the dignity and purpose of work. Using information from a variety of sources, students solve problems and make decisions about jobs, related incomes, and realistic living expenses. Students learn to apply effective problem solving and decision making skills involved in different types of remuneration, calculating various forms of taxes or discounts when purchasing of items. Mental mathematics and estimations play an important role in the purchasing and comparison of costs of items. The unit culminating task reinforces problem-solving and decision-making skills by comparing a calculated monthly income with a set of estimated monthly expenses, solve problems to determine whether the income can support the expenses, and make decisions about living within their means.

### **Unit 2 - Metric VS Imperial**

Numerical and logical patterns abound in the world around us. In this unit, students investigate a variety of patterns. Using appropriate tools and/or technology, they estimate and measure using both metric system and imperial system. Students are also given the opportunity to explore native people's traditional techniques of measurement. Students will solve problems drawn from everyday applications, collect, read and interpret data. Students will also describe applications from everyday life that involve a combination of perimeter and area.

### **Unit 3 - Unlocking the Mysteries of Circles and building a model**

Students investigate characteristics of circles and the relationship between circumference and diameter through data collection and concrete materials. They make connections between common angles and their previous experiences with fractions and percent of circles. Students investigate the volume of a cylinder by modelling the volume with concrete materials and by making connections to the volume of a rectangular prism. They determine a formula and calculate the volume of a variety of cylinders from their environment. Students investigate the effect on volume by varying the dimensions of a cylinder and apply this information to mini-simulations that analyse consumer promotions and claims. Investigations involving the capacity of a can, possible dimensions, and the amount of material required to construct it introduce students to the concept of an optimal container size.

#### **Unit 4 - Proportional Reasoning**

Students explore ratio and rate in real life contexts. They apply proportional reasoning through investigations in real life contexts to solve problems related to measurement, geometry and data management. Students build on and extend their understanding of fractions to include ratios, decimals, proportions and percent. Students use diagrams, charts, and drawings to gain a greater understanding of concepts such as scale drawings, unit pricing, and sampling. Opportunities to practice the skills of estimation and judging the reasonableness of an answer are provided through out the unit.

#### **Unit 5 - Summative Assessment**

The course concludes with a summative assessment unit consisting of a series of activities and a formal examination. Students will display their knowledge in written and concrete form through activities that are based on learning expectations of this course

### ***Teaching/Learning Strategies***

Students learn mathematics best when they have:

- opportunities to experience frequent success;
- experiences that involve tools to support thinking, such as manipulatives, concrete materials, and technology;
- authentic, relevant, and engaging activities;
- teacher feedback that helps students fill the gaps in their learning;
- opportunities to revisit and consolidate concepts;
- tasks that convince them that they are capable of learning.

Teachers facilitate student understanding by:

- believing that students are capable of learning;
- building conceptual understanding developmentally;
- using a spiral approach to curriculum implementation so students revisit the expectations through different contexts;
- making learning an active “doing” process;
- focussing on what is important to know and do;
- designing tasks that are achievable;
- providing multiple opportunities for students to demonstrate what they know, rather than what they do not know;
- providing multiple entry points;
- providing feedback about how to improve and opportunities to incorporate that feedback;
- scaffolding learning through guiding questions;
- providing a variety of teacher-directed, small-group, and whole-class learning experiences.

## Evaluation

The final grade will be determined as follows:

- Seventy per cent of the grade will be based on evaluation conducted throughout the course. This portion of the grade should reflect the student's most consistent level of achievement throughout the course, although special consideration should be given to more recent evidence of achievement.
- Thirty per cent of the grade will be based on a final evaluation administered at or towards the end of the course. This evaluation will be based on evidence from one or a combination of the following: an examination, a performance, an essay, and/or another method of evaluation suitable to the course content. The final evaluation allows the student an opportunity to demonstrate comprehensive achievement of the overall expectations for the course.

*Growing Success: Assessment, Evaluation and Reporting in Ontario Schools.* Ontario Ministry of Education Publication, 2010.

Type of Assessment	Category	Details	Weighting %	
Term Work (70%)	Knowledge/Understanding	- solve problems drawn from everyday situations involving money; - solve problems involving area and volume.	13%	
	Thinking	- determine the approximate value of Pi; - solve problems involving measurements of circles, rectangles, cylinders, and rectangular prisms.	19%	
	Communication	- communicate information about money sense; - communicate information about measurement concepts; - explain why some graphs might be misleading.	19%	
	Application	-make estimates and measurements to extend understanding of the metric and imperial systems; - solve problems drawn from everyday situations, demonstrating skill and understanding in the use of fractions, percentages, ratios, and rates.	19%	
Final Assessment (30%)	Culminating Activity		K/U	3%
			T	4%
			C	4%
			A	4%
	Final Exam		K/U	3%
			T	4%
			C	4%
			A	4%
			TOTAL	100%

## ***Assessment/Evaluation Strategies***

Assessment is a continuous process of gathering information about student learning and performance over time using a variety of sources. The purpose of collecting this information is to help students get better at what they are learning. Assessments are opportunities for teachers to guide learning in the same manner that a coach provides feedback about how to improve. They are opportunities for students to explore, clarify, and practise what they are learning. Research studies show that assessment that provides descriptive feedback only (as opposed to marks only, or marks and descriptive feedback) about the evidence in the student's work relative to a target and information about how to fill the gap not only raises achievement scores for all students, it results in dramatic improvements in the scores of students who had previously experienced little academic success (Black and William).

In each unit, there are extensive supports given for assessing and evaluating student learning during the activities. Throughout each stage of the activities, there are suggestions for providing immediate and ongoing feedback to move students forward in their learning. Teachers use their professional judgement and their knowledge of the students in selecting opportunities, strategies, and tools for this process.

Once students have had numerous opportunities to practise, receive feedback, and incorporate the feedback into subsequent tasks, students must provide evidence of learning and teachers must make a judgment about what has been learned in terms of a grade or level. The performance tasks are evaluations of student learning, used solely for reporting achievement. Teachers who use assessments to improve learning recognize that the tasks created to evaluate what the student has learned will reflect the content and processes for which the student has received feedback and been given opportunities to incorporate that feedback prior to the evaluation.

The Achievement Chart describes four different lenses or categories through which to view and assess mathematical understanding. Knowledge and Understanding is knowledge of content, facts, and procedural skills or use of tools. Application is the ability to apply knowledge and skills to familiar and new contexts, as well as the ability to make connections between different contexts. Thinking/Inquiry/Problem Solving involves the use of critical- (planning, making links to prior knowledge, evaluating, and processing) and creative-thinking skills. Communication involves the expression and organization of ideas, creation and use of representations, and the use of conventions. For students to demonstrate their understanding of mathematics through these lenses, the teacher must select the appropriate assessment strategy.

For example:

<b>Category</b>	Knowledge and Understanding	Application	Thinking	Communication
<b>Strategy</b>	tests, quizzes, observation of performance tasks	tests, quizzes, performance assessment	performance assessment, observation, conferencing, projects	journals, portfolios, performance assessments, observations, presentations

In consideration of the multiple learning styles that students bring to each learning experience, teachers must consider selecting from a variety of assessment methods that invite students to demonstrate understanding through writing (paper-and-pencil), doing (performances), and speaking (personal communication) according to their area of strength.

Assessment and Evaluation tools that can be used to guide the assessment strategy or track, monitor, or record assessment data include:

- rubrics;
- checklists;
- rating scales;
- marking schemes;
- anecdotal comments;
- rubrics.

Student understanding is best demonstrated through authentic performances that involve students in doing mathematics. It is important that the final unit assessments reflect those concepts, skills, and ideas that are important for students to know and be able to do long after the course is over. The spiral design of this course ensures that students have multiple opportunities to demonstrate understanding. Concepts that were not well understood early in the course should not influence the final grade. More recent, most consistent performance should be reported if the grade a student receives is to be an accurate reflection of what the student has learned by the end of the course.

The activities written in this Course Profile are learning tasks with the exception of the end-of-unit summative tasks. Each of the learning activities in the units is accompanied by assessment suggestions to improve learning and provide feedback to students to help them improve what they are learning. It is expected that teachers will use their professional judgment to determine when they should evaluate or collect evidence of learning in terms of a mark or grade. In general, these opportunities have not been identified in this Course Profile because the decision-making processes around evaluation involve many variables including, but not limited to, the interplay between students, their learning, and the teacher. It is expected that these evaluations or judgments of student performance would occur only after students have had sufficient opportunities to practise, receive feedback, and incorporate feedback into subsequent

tasks. The evaluations that a teacher designs to judge what a student has learned must reflect both the content and the processes that students experienced while learning. As such, evaluations should collect information from across the categories of the Achievement Chart, focus on the key knowledge and skills for the unit, and reflect the variety of strategies, methods, and tools available for judging student understanding.

## **Resources**

Ontario Ministry of Education. (2010). *Growing success: Assessment, evaluation and reporting in Ontario schools*. Toronto, ON: Queen's Printer for Ontario.

Ontario Ministry of Education. (2016). *Ontario Schools, Kindergarten to Grade 12: Policy and Program Requirements*. Retrieved from <http://edu.gov.on.ca/eng/document/policy/os/index.html>

McGraw-Hill Ryerson. (2005). *Mathematics Essential 10*.

## **Program Planning**

This course is offered to Indigenous students living in isolated northern Ontario communities which do not have access to regular high school facilities, equipment or teachers associated with secondary education. This course uses the internet for instruction, demonstration and research. It utilizes a student-centered semi-virtual classroom which capitalizes on the strengths of internet program delivery to minimize the disadvantages of geographic remoteness.

Students are presented with 1320 minutes of instruction/activity via the internet over the period of one week. All lessons, assignments, questions and course material is presented in this manner, with approved print materials available as a student resource in each classroom. The student and instructor communicate via the internet, while a classroom mentor (a fully qualified teacher) assists students in completing tasks in a timely manner and provides tutoring as required. Students may also receive support from various programs at KiHS, including the First Nation Student Success Program and the Special Education Program.

Indigenous and local content is used throughout the course to meet students' learning needs. Considerations are made to the learning preferences of the student population and lessons can be adjusted for individual students as required.