

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: Tammy West

Developed by: Tammy West Date: February 2010

Revision Date:

Developed from: The Ontario Curriculum, Grades 9 and 10, Mathematics

Profile Name: Mathematics, Locally Developed

Text: N/A

Prerequisite: MAT1L, MFM1P/MFM1D

Credits: 1

Length: 110 hours

Principal's Name: Darrin Potter

Principal's Approval (signature) _____

Approval Date:

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

EMSV.01 • solve problems drawn from everyday situations involving money, demonstrating skill and understanding in the use of decimal numbers;

EMSV.02 • communicate information about money sense;

EMSV.03 • use literacy skills (reading, writing, listening, and speaking) to extend their money sense.

Extending Understanding Measurement

EUMV.01 • make estimates and measurements to extend understanding of the metric system;

EUMV.02 • make estimates and measurements to extend understanding of the imperial system;

EUMV.03 • solve problems involving measurements of circles, rectangles, cylinders, and rectangular prisms, using metric units in applications drawn from everyday life and the workplace;

EUMV.04 • communicate information about measurement concepts;

EUMV.05 • use literacy skills (reading, writing, listening, and speaking) to extend understanding of measurement.

Extending Understanding of Proportional Reasoning

EPRV.01 • solve problems drawn from everyday situations, demonstrating skill and understanding in the use of fractions, percentages, ratios, and rates;

EPRV.02 • communicate information drawn from a variety of sources;

EPRV.03 • use literacy skills (reading, writing, listening, and speaking) to extend understanding of proportional reasoning.

Course Content

Unit 1	Mathematics and Data – Like Bread and Butter	15 hours
Unit 2	Unlocking the Mysteries of Circles	15 hours
Unit 3	Choices and Decisions	21 hours
Unit 4	Get Ready, Get Set, Go!	16 hours
Unit 5	Planning an Event	19 hours
Unit 6	Build a Model	17 hours
Unit 7	The Essential Event	7 hours
	TOTAL	110 hours

Unit Descriptions

Unit 1 - Mathematics and Data – Like Bread and Butter

Students collect data, construct bar graphs, and analyse personal information through a learning styles survey and by participating in the Census at School International student survey using *Fathom*TM software. Students explore a variety of graphical representations of information, including bar, circle, and line graphs. They determine which graphical representation is appropriate for a given context and apply their understanding to identify graphical misrepresentations of information.

Unit 2- Unlocking the Mysteries of Circles

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 explore authentic applications of the problems involving the circumference and diameter of circles through everyday objects. In the summative activity, students apply their knowledge of the parts of the circle and the relationship between the circumference and diameter and angles to an archaeological reconstruction of a plate from a sherd. The process begins with a description of the fragment and culminates in the painting of designs on the plate and a description of the features of the reconstructed plate.

Unit 3- Choices and Decisions

Students calculate personal usage rates and read, construct, and interpret graphs to assess and evaluate personal choices and make informed decisions regarding water and electrical power use. Students apply their experience in making personal decisions about water use to formulate a water conservation plan for their school. They develop an understanding of the abundance and misuse of water in Canada by comparing local data with the global community.

Unit 4- Get Ready, Get Set, Go!

Using information from a variety of sources, students solve problems and make decisions about jobs, related incomes, and realistic living expenses. They use bus and train schedules to work through problems relating to rates, and calculate distance travelled and elapsed time. Students compare 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. The unit culminating task reinforces problem-solving and decision-making skills by requiring students to determine whether they can afford to save for a short holiday given a specific job, income, and set of monthly expenses.

Unit 5- Planning an Event

Students plan a classroom fun fair for the purpose of raising money for a small school improvement project. Preparation for the event involves the creation of a budget, the application of ratios and unit rates to bulk food purchases and recipes, and the costing of food sales. The entertainment for the fun fair consists of games that the students create using their knowledge of the area of circles and angles. Preparation for the games requires the construction of a scale drawing of their game booths and costing the price of each turn playing the game. After the fun fair event, students calculate the profits and adjust the parameters of the school improvement project based on the final fun fair profits. Students make submissions to an event portfolio at the end of each activity in addition to the estimate of the school improvement project cost and the final profit calculations.

Unit 6- Build a Model

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 7- The Essential Event

This final summative task involves students in planning a charitable event. Teacher-led discussions provide guidance to the size and scope of the event. The event must include a predetermined set of criteria, regardless of size and scale. The final product includes an itemized list of materials, a schedule of events, a scale diagram of the eating area, a publicity poster or invitation, and a written rationale. The focus is on decision-making and organizational skills.

Teaching/Learning Strategies

Students taking the Locally Developed Compulsory Credit course 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 of the Locally Developed Compulsory Credit course 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 student’s final grade for the course will be determined as outlines in Program Planning and Assessment 2000 (p.15).

Seventy per cent (70%) of the grade will be based on evaluations conducted throughout this course. This portion of the grade should reflect the students’ *most consistent level of achievement* throughout the course, although special consideration should be given to the more recent evidence of achievement.

Thirty per cent (30%) of the grade will be based on a final evaluation in the form of an examination, performance, essay and /or other method of evaluation suitable to the course content and administered towards the end of the course.

Type of Assessment	Category	Details		Weighting (%)
Formative (70%)	Knowledge/ Understanding			13%
	Thinking/ Inquiry			19%
	Communication			19%
	Application			19%
Summative (30%)	Culminating Activity		Knowledge/ Understanding	3%
			Thinking/ Inquiry	4%
			Communication	4%
			Application	4%
	Final Exam		Knowledge/ Understanding	3%
			Thinking/ Inquiry	4%
			Communication	4%
			Application	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 Wiliam).

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 are encouraged to 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:

Category	Knowledge and Understanding	Application	Thinking/Inquiry/ Problem Solving	Communication
Strategy	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;
- checkbrics.

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

ProQuest, <http://www.umi.com/proquest>

This website provides access to more than 3000 journals, magazines, dissertations, newspapers, and other publications, for a fee. This is a good source of secondary data. There are several similar services available.

Program Planning

This course is offered to 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 800 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 resources in each classroom. The student and instructor communicate via internet, while a classroom mentor (a fully qualified teacher) assists students in completing tasks in a timely manner and provides tutoring as required.