Course Outline

School Name:	KEEWAYTINOOK INTERNET HIGH SCHOOL
Department Name:	Mathematics
Ministry of Education Course Title: Locally Developed Essentials Math	
Grade Level: 10	
Ministry Course Code: MAT2L	

Teacher's Name: Nikki Osborne

Developed by: Erik Tu Date: August 2021

Revision Date: September 2020

Developed from:

Ontario Ministry of Education. (2004). Guide to locally developed courses, grades 9 to 12: Development and approval procedures. Toronto, ON: Queen's Printer for Ontario.

Ontario Ministry of Education. (2005). *The Ontario curriculum, grade 9 and 10: Mathematics.* Toronto ON: Queen's Printer for Ontario.

Text: None

Prerequisite: MAT1L, MFM1P or MFM1D

Credits: One

Length: 110 hours

Principal's Name: Angela Batsford-Mermans

Principal's Approval: 

Approval Date: September 13, 2021

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 into 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. Indigenous examples of math applications are included. 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	Length
1. Working for our Money	31 hours
2. Metric VS Imperial	22 hours
3. Unlocking the Mysteries of Circles	23 hours
4. Proportional Reasoning	34 hours
Total	110 hours

Unit Descriptions

Unit 1 – Transition to Adulthood

In this unit, students will think critically about the purpose of work. They will use information from a variety of sources, solve problems and make decisions about jobs, related incomes, and realistic living expenses. They will take into consideration the differences between life in an isolated, northern community, small towns and cities. Students will learn to apply effective problem solving and decision making skills involved in different types of remuneration, calculating various forms of taxes and discounts when purchasing items. Mental mathematics and estimations play an important role in the purchasing and comparison of costs of items. The unit culminating task will reinforce problem-solving and decision-making skills by comparing a calculated monthly income

with a set of estimated monthly expenses, solving problems to determine whether the income can support the expenses, and making 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 will investigate a variety of patterns. Using appropriate tools and/or technology, they will estimate and measure using both the metric system and the imperial system. Students will explore traditional Indigenous techniques of measurement, such as 'misit' and 'mitigon'. Students will solve problems drawn from everyday applications, collect, read and interpret data. Students will also describe applications that involve a combination of perimeter and area in their everyday lives.

Unit 3 – Unlocking the Mysteries of Circles
Students will investigate characteristics of circles and the relationship between circumference and diameter through data collection and concrete materials. They will make connections between common angles and their previous experiences with fractions and percentages. Students will 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 will determine a formula and calculate the volume of a variety of cylinders from their environment such as culverts and water pipes, canned foods and drinks. Students will investigate the effect on volume by varying the dimensions of a cylinder and they will apply this information to mini-simulations that analyse consumer promotions and claims, including advertisements from the local community stores when possible. 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 will explore ratio and rate in real life contexts such as how to find the best price when shopping at The Northern. They will apply proportional reasoning through investigations in real life contexts such as finding the best store to buy ground beef from to solve problems related to measurement, geometry and data management. Students will 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. Practical opportunities such as comparing the distances of unknowns to known distances of body parts allow students to practice the skills of estimation and judging the reasonableness of an answer are provided throughout 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

This course is organized into an eight-week series of lessons and activities that are presented to students in remote northern communities via the internet. The eighth week is used for course consolidation, review, and the final examination. Teacher and students communicate over the internet through timely activity feedback, emails, messages, video and audio calls. Mentors in the classrooms assume the role of liaison between the teacher and student while also supporting a holistic approach to motivate, engage and support each individual student.

A variety of strategies are used in the online delivery of this course. Some instructional strategies include:

- Use of current and local information to promote relevance and authentic, engaging activities
- Many opportunities for student success
- Regular, constructive feedback
- Positive reinforcement to foster students' confidence in their mathematical abilities
- Opportunities for review and consolidation
- Integrated technology

- Experiences that involve tools to support thinking, such as manipulatives and concrete materials

Teachers can 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

Learning goals are discussed at the beginning of each assignment and success criteria is provided to students. The success criteria are used to develop the assessment tools in this course, including rubrics and checklists.

Evaluation

The final grade will be determined as follows (Ontario Ministry of Education, 2010):

- 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 (p. 41).

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

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 measurement 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 Evaluation (30%)	Culminating Activity (15%)	Knowledge/Understanding	3
		Thinking	4
		Communication	4
		Application	4
	Exam (15%)	Knowledge/Understanding	3
		Thinking	4
		Communication	4
		Application	4
		TOTAL	**100**

Assessment/Evaluation Strategies

A variety of assessment and evaluation methods, strategies and tools are required as appropriate to the expectation being assessed. These include diagnostic, formative, and summative within the course and within each unit.

Assessment *for* learning and assessment *as* learning is obtained through a variety of means, including the following:

- Ongoing descriptive feedback (eg. on Moodle, in group chats, phone calls etc.)
- Self-assessment (ex. checking estimates vs actual calculations)
- Mentor observations
- Conversations with student on a regular basis to verbalize observations, ask questions, and clarify understanding.

Evidence of student achievement (assessment *of* learning) is collected from various sources, including the following:

- Ongoing observations of most consistent work, with consideration given to most recent work (e.g., evidence of meeting expectations for food safety during set-up for class celebration)
- Conversations with students
- Summative unit activities
- Culminating activity
- Exam

The Ministry of Education's 2010 document, *Growing Success*, outlines the seven fundamental principles that guide best practice in the assessment and evaluation of students. KiHS teachers use practices that:

- are fair, transparent, and equitable for all students;
- support all students, including those with special education needs, those who are learning the language of instruction (English or French), and those who are First Nation, Métis, or Inuit;
- are carefully planned to relate to the curriculum expectations and learning goals and, as much as possible, to the interests, learning styles and preferences, needs, and experiences of all students;
- are communicated clearly to students and parents at the beginning of the course and at other points throughout the school year or course;
- are ongoing, varied in nature, and administered over a period of time to provide multiple opportunities for students to demonstrate the full range of their learning;
- provide ongoing descriptive feedback that is clear, specific, meaningful, and timely to support improved learning and achievement;
- develop students' self-assessment skills to enable them to assess their own learning, set specific goals, and plan next steps for their learning (p.6).

Resources

Council of Ontario Directors of Education (CODE). (2005). *Locally Developed Compulsory Courses (LDCC): Mathematics.* http://www.edugains.ca/resources/CurriculumDocuments/LDCC_Math_9_10.pdf

EduGAINS. (n.d.). Mathematics K - 12. Retrieved on October 6, 2020, http://www.edugains.ca/newsite/math/index.html

Mathematics Knowledge Network. (n.d.). Indigenous knowledge. Retrieved on October 6, 2020, http://mkn-rcm.ca/indigenousknowledge/

Étienne, S.A., Clarke, J., Galvao, A., Suurtamm, L., Warrington, C., & Stewart., L. (2005). *Math essentials 10.* McGraw-Hill Ryerson.

Ontario Ministry of Education. (n.d.). *Indigenous education strategy.* http://www.edu.gov.on.ca/eng/aboriginal/

Ontario Ministry of Education. (2004). *Guide to locally developed courses, grades 9 to 12: Development and approval procedures.* http://www.edu.gov.on.ca/eng/curriculum/secondary/math1112currb.pdf

Ontario Ministry of Education. (2005). *The Ontario curriculum, grade 9 and 10: Mathematics.* http://www.edu.gov.on.ca/eng/curriculum/secondary/math910curr.pdf

Ontario Ministry of Education. (2010). *Growing success: Assessment, evaluation and reporting in Ontario schools*. Toronto ON: Queen's Printer for Ontario. http://www.edu.gov.on.ca/eng/policyfunding/growSuccess.pdf

Ontario Ministry of Education. (2014). *Achieving excellence: A renewed vision for education in Ontario.* Toronto ON: Queen's Printer for Ontario.

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

Tomlinson, C. (2014). *The differentiated classroom: Responding to the needs of all learners*. ASCD.

Toulouse, P.R. (2016). What matters in Indigenous Education: Implementing a vision committed to holism, diversity and engagement. https://peopleforeducation.ca/wp-content/uploads/2017/07/MWM-What-Matters-in-Indigenous-Education.pdf

Program Planning

This course is offered to Indigenous students living in isolated, northern Ontario communities. It is offered by qualified teachers in a blended classroom with a balance of academic, wellness, land-based learning, local language and culture to support the success of the whole student. 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 support as required.

Indigenous and local content is used throughout the course to meet students' learning needs. Opportunities for outdoor activities and land-based learning are also incorporated and students are encouraged to use local knowledge in their products. Considerations are made to the learning preferences of the student population and lessons can be adjusted for individual students as required. Opportunities have been provided for students to apply ideas and concepts encountered in this course to their lives as an individual and as a member of a First Nations community. Teachers consult the Ontario Ministry of Education policies, guidelines and important initiatives when planning a comprehensive program in this area.