

Course Outline

School Name:	KEEWAYTINOOK INTERNET HIGH SCHOOL
Department Name:	Mathematics
Ministry of Education Course Title:	Foundations of Mathematics, Grade 9, Applied
Grade Level:	9
Ministry Course Code:	MFM1P

Teacher's Name: Lakhwinder Singh Kang

Developed by: Christine Avgeropoulos Date: October 2009

Revision Date: September 2018

Developed from: Ontario Curriculum, Grades 9 and 10 Mathematics, 2005

Text: Math power 9, McGraw-Hill Ryerson, Ontario Edition, 2006

Prerequisite: None

Credits: One

Length: 110 hours

Principal's Name: Kevin Dempsey

Principal's Approval (signature)



Approval Date: September 11, 2018

Course Description/Rationale

This course enables students to develop an understanding of mathematical concepts related to introductory algebra, proportional reasoning, and measurement and geometry through investigation, the effective use of technology, and hands on activities. Students will investigate real life examples to develop various representations of linear relations, and will determine the connections between representations. They will also explore certain relationships that emerge from the measurement of three-dimensional figures and two dimensional shapes. Students will consolidate their mathematical skills as they solve problems and communicate their thinking.

Overall Curriculum Expectations

Number Sense and Algebra

- solve problems involving proportional reasoning;
- simplify numerical and polynomial expressions in one variable, and solve simple first degree equations.

Linear Relations

- apply data-management techniques to investigate relationships between two variables;
- determine the characteristics of linear relations;
- demonstrate an understanding of constant rate of change and its connection to linear relations.

Measurement and Geometry

- determine through investigation, the optimal values of various measurements of rectangles;
- solve problems involving the measurements of two-dimensional shapes and the volumes of three-dimensional figures;
- determine, through investigation facilitated by dynamic geometry software, geometric properties and relationships involving two-dimensional shapes, and apply the results to solving problems.

Course Content

Unit	Length
1. Number Sense and Algebra	33 hours
2. Relationships	44 hours
3. Dynamic Geometry and Measurement	33 hours
Total	110 hours

Unit Descriptions

Unit 1 – Number Sense and Algebra

In this unit, students will be solving problems involving proportional reasoning, as well as simplifying expressions and solving equations. Various topics related to number sense and algebra are covered, including integers, fractions, ratios, ratios, percentages, exponents, and variables. Students will use the knowledge from this unit to support other areas of the course.

Unit 2 - Relationships

This unit will introduce vocabulary like 'slope' and 'intercepts' and how the abstraction of x's and y's can be used to solve problems. Students will use the ideas and contexts from the first unit to develop algebraic models of linear relations. Students will also explore and determine the characteristics of lines and their corresponding equations through the use of spreadsheets, graphing technology, and paper and pencil. To solve problems, students will recognize and model

realistic situations that involve constant rates of change. The need for algebraic techniques, numeric skills and the laws of exponents will emerge from problems in context.

Unit 3 - Dynamic Geometry and Measurement

In this unit, students will use concrete materials, diagrams, drawings and dynamic geometric software to investigate the properties of three dimensional objects, optimal measurements and geometric relationships of two dimensional figures. Students will confirm and extend their intuitive understanding of geometric properties through inquiry. They will pose questions, make observation with the help of the technology, judge the reasonableness of answers and solve multi step problems.

Teaching/Learning Strategies

This course is organized into an eight-week series of lessons and activities that will be presented to students in remote northern communities via the internet. The eighth week will be used for course consolidation, review and the final examination. Teacher and students will communicate over the internet, while mentors in the classrooms will assume the role of liaison between the teacher and student.

A variety of strategies will be used in the online delivery of this course. Some instructional strategies include

- whole class, small group and individual instruction;
- computer-assisted instruction;
- hands-on learning experiences;
- reinforcing math skills through interactive games;
- review of previously learned material;
- pre-teaching of key vocabulary;
- problem-solving instruction; and
- graphic organizers.

Learning goals will be discussed at the beginning of each assignment and success criteria will be 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. 47).

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	Determine the characteristics of linear relations. Demonstrate an understanding of constant rate of change and its connection to linear relations.	13
	Thinking	Determine through investigation, the optimal values of various measurements of rectangles; Carry out an investigation or experiment involving relationships between two variables.	19
	Communication	Simplify numerical and polynomial expressions in one variable, and solve simple first degree equations. Create an original illustration to incorporate geographic features.	19
	Application	Solve problems involving the measurements of two-dimensional shapes and the volumes of three-dimensional figures. Determine through investigation facilitated by dynamic geometry software, geometric properties and relationships involving two-dimensional shapes, and apply the results to solving problems.	19
Final Evaluation (30%)	Culminating Activity (15%)	Knowledge/Understanding	3
		Thinking	4
		Communication	4
		Application	4
	Final Examination (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 on students' assignments
- Conversations with mentor to check for understanding
- Conversations with student/instructor on a regular basis (synchronous and asynchronous)
- Self-assessment from interactive math games

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
- Quizzes
- Culminating activity
- Final exam

Resources

Ontario Ministry of Education. (2007). *First Nation, Métis, and Inuit education policy framework*. Retrieved from <http://www.edu.gov.on.ca/eng/aboriginal/fnmiFramework.pdf>

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>

Ontario Ministry of Education. (2007). *The Ontario curriculum grades 11 and 12: English*. Toronto, ON: Queen's Printer for Ontario.

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.