Canada World Education

Course Outline

Course: PRINCIPLES OF MATHEMATICS (ACADEMIC)			
Grade: 9	**Type: U** C M O E	**Credit Value:** 1 **Credit hours:** 110	**Course code:** MPM1D **Dept:** Mathematics
Teacher: David Bocknek		**Development date:** Apr. 2020	
Course Reviser: J.F. Michaud **Date:** May 2020		**Prerequisites:** none	

Resources Required: electronic device with internet access
Text book: none required
Supplementary resources:
Principles of Mathematics 9, McGraw-Hill Ryerson
Principles of Mathematics 9, Nelson Education

Ministry Curriculum Documents:
- The Ontario Curriculum Grades 9 and 10 Mathematics
- Growing Success – Assessment, Evaluation and Reporting in Ontario
  Schools - 2010
- Learning for All – A Guide to Effective Assessment and Instruction for All
  Students, Kindergarten to Grade 12, 2001
- Environmental Education: Scope and Sequence of Expectations, 2017
- Course Descriptions and Prerequisites, Grades 9 to 12, 2018
- Equity and Inclusive Education in Ontario Schools: Guidelines for Policy
  Development and Implementation
- Financial Literacy: Scope and Sequence of Expectations, Grades 9-12, 2016
- First Nations, Métis, and Inuit Connections – Scope and Sequence of
  Expectations, 2016
- Health and Safety: Scope and Sequence of Expectations, Grades 9–12, 2017

Course Description
This course enables students to develop an understanding of mathematical concepts related to algebra, analytic geometry, and measurement and geometry through investigation, the effective use of technology, and abstract reasoning. Students will investigate relationships,which they will then generalize as equations of lines,and will determine the connections between different representations of a linear relation.They will also explore relationships that emerge from the measurement of three-dimensional figures and two-dimensional shapes. Students will reason mathematically and communicate their thinking as they solve multi-step problems.

Overall Expectations

By the end of this course, students will:
• demonstrate an understanding of the exponent rules of multiplication and division, and apply them to simplify expressions;
• manipulate numerical and polynomial expressions, and solve first-degree equations.
• apply data-management techniques to investigate relationships between two variables;
• demonstrate an understanding of the characteristics of a linear relation;
• connect various representations of a linear relation.
• determine the relationship between the form of an equation and the shape of its graph with respect to linearity and non-linearity;
• determine, through investigation, the properties of the slope and y-intercept of a linear relation;
• solve problems involving linear relations.
• determine, through investigation, the optimal values of various measurements;
• solve problems involving the measurements of two-dimensional shapes and the surface areas and volumes of three-dimensional figures;
• verify, through investigation facilitated by dynamic geometry software, geometric properties and relationships involving two-dimensional shapes, and apply the results to solving problems.

Outline of course content :
Unit: 1 Number Sense   Hours:10
Unit: 2 Powers and Polynomials   Hours:15
Unit: 3 Linear Relations   Hours:10
Unit: 4 Linear Equations   Hours:13.5
Unit: 5 Analytic Geometry   Hours:15
Unit: 6 Investigating Geometric Relationships   Hours:15
Unit: 7 Properties of 2D and 3D figures   Hours:15
Unit: 8 Measurement   Hours:15
Exam   Hours: 1.5
                                                            Total hours:110

All components of the course are delivered online

Mark reporting
Student marks will be posted online so that parents and students can see student progress and current marks through a secure reporting software.

Mark breakdown
Evaluations Throughout the course: 70% of final grade
Final Evaluation: 30% of final grade

The term work and Exam will be broken down in the following skill Categories:

Knowledge and Understanding   30%
Thinking   20%
Communication   20%
Application   30%

The activities completed during the course will account for the following percentages:

Assignments   22%
Quizzes   15%
Tests   23%
Exam   30%

Achievement levels

Level 1 50-59%	Level 2 60-69%	Level 3 70-79%	Level 80-100%

Teaching and Learning Strategies
Teachers use a variety of teaching strategies to maximize student learning. The following teaching strategies will be used in this course:

Teacher will utilize instruction that both responds to the characteristics of a diverse group of students and is precisely tailored to the unique strengths and needs of each student can be achieved using the principles and guidelines associated with three instructional approaches:

1) Universal Design for Learning (UDL),

2) Differentiated instruction

3) The tiered approach to prevention and intervention. (Learning for All, Kindergarten to Grade 12: For more info please see http://www.edu.gov.on.ca/eng/general/elemsec/speced/LearningforAll2013.pdf)

 What are UDL-aligned strategies? https://goalbookapp.com/toolkit/strategies

• UDL-aligned strategies are instructional methods and tools used by teachers to ensure that ALL students have an equal opportunity to learn. All of our strategies are aligned with Universal Design for Learning (UDL) guidelines. These guidelines help you to select strategies that remove barriers in instruction so that all students can achieve their learning goals.

 • Differentiated Instruction is based on the idea that because students differ significantly in their interests, learning styles, and readiness to learn, it is necessary to

adapt instruction to suit these differing characteristics. Teachers can differentiate one or a number of the following elements in any classroom learning situation (Tomlinson, 2004): the content of learning (what students are going to learn, and when); the process of learning (the types of tasks and activities); the products of learning (the ways in which students demonstrate learning); the affect/environment of learning (the context and environment in which students learn and demonstrate learning). (http://edugains.ca/newsite/di/index.html)

Teaching and learning strategies adopted should be appropriate to the course type and should reflect an appropriate balance of theoretical components, practical applications for the course and appropriate to the range of student learning.

Helping students become self-directed.

In order to address the unique learning styles of students in this course, a variety of activities and learning experiences should be offered, including, but not restricted to: questioning, demonstrations, role-plays, simulations, co-operative group learning, brainstorming, discussion, peer coaching, interviewing, reflective writing, reflective thinking exercises, concept mapping, reading, tutoring, direct instruction, one-on-one teaching, and experiential learning.

Teachers will find ways throughout the course for students to make authentic learning connections with their other courses, the school, local community and the world at large.

Examples of teaching strategies:

• Brainstorming	• Media Presentation
• Be the teacher	• Peer feedback
• Case Studies	• Planning and writing analytical pieces of work
• Computer technology – reports, spreadsheets, flow charts , data bases, electronic presentation;	• Provide specialized vocabulary
• Conferences	• Reading: read for meaning
• Documentaries/Videos /Ted Talks/Video critique	• Reading: to develop the ability to use specialized vocabulary
• Flexible Grouping	• Research Project –individual
• Focus Groups–Informal discussions based on focus questions	• Research Project-group
• Formal Debates/Informal debates	• Role-play
• Graphic Organizers	• Seminar
• Group critique	• Skype interviews
• Group Discussions	• Socratic Teaching
• Independent Study	• Structured discussion
• Informal Debates	• Think-Pair Share
• Internet Based Research/Investigation	• UDL-Aligned Strategies (see

| • Interview | https://goalbookapp.com/toolkit/strategies) |
| • Investigative and inquiry questions | • Write or give a personal perspective in discussions |

Assessment & Evaluation of Student Performance
Assessment & Evaluation
The primary purpose of assessment and evaluation is to improve student learning and to help students assume responsibility for their learning.

Mid-term and final marks are determined through evaluations or Assessments *of* Learning, which typically occur towards the end of a unit and end of the term. During the learning process, information about a student's learning is gathered and used by the teacher and student to inform decisions that affect goal setting and teaching in the classroom. The data gathered as Assessment *as* Learning and Assessment *for* Learning do not carry a mark weight, but do play a crucial role in student success as they help inform the teacher about each student's progress. All types of assessments allow teachers to provide descriptive feedback that is clear, specific, meaningful, and timely to support improved learning and achievement.

Learning Skills and Work Habits (responsibility, organization, independent work, collaboration, initiative, self-regulation) will be reported by a letter (E = Excellent, G = Good, S = Satisfactory, N = Needs Improvement). These skills and habits support a high level of success in meeting the course expectations in addition to contributing to the development of positive life and work skills for the future.

Assessment as Learning	**Assessment for Learning**
Student Product ● Entrance tickets ● Graphic organizers-KWL ● Journal ● Peer assessment ● Peer editing checklist ● Pre-tests/Diagnostic tests ● Quizzes ● Reflections ● Rough drafts ● Self assessment ● Self-proofreading using a checklist ● Practical task	**Student Product** ● 3-Minute Pause ● Assignments ● Diagnostic Assessment ● Exit tickets ● Graphic organizers ● Homework ● Journals/Letters/Emails ● Know, WonderLearn (KWL) ● Learning Logs ● Presentation (PPT/Prezi..) ● Problem solving ● Quiz/problem solving ● Vocabulary notebook

	● Project ● Practical task
Observation ● Checklist/Feedback for group discussion ● Peer rating on presentations ● Teacher anecdotal feedback ● Teacher feedback for a task ● Teacher rating for a task ● Whole class discussion	**Observation** ● Class discussions ● Demonstrations ● Informal debate ● Performance tasks ● Presentations ● Role Play
Conversation ● Student teacher conversations ● Questioning ● Moderated group discussions ● Peer-Oral feedback	**Conversation** ● Brainstorming ● Debate ● Focused Conversations ● Oral pre-tests ● Oral quizzes ● Interviews ● Pair work ● Group work ● Portfolio conferencing ● Student teacher conferences

Considerations for Program Planning

- Individual Education Plan: Accommodations to meet the needs of exceptional students as set out in their Individual Education Plan will be implemented within the classroom program. Additional assistance is available through tutoring.

- The Role of Technology in the Curriculum. Using information technology will assist students in the achievement of many of the expectations in the curriculum regarding research, written work, analysis of information, and visual presentations.

- English As a Second Language (ESL): Appropriate accommodations in teaching, learning, and evaluation strategies will be made to help ESL students gain proficiency in English.

- Programs will involve an open, collaborative, activity-based approach to teaching that accommodates students' interests, aspirations, and learning styles. Activities will be designed to include both individual and team

approaches, with emphasis on equity and inclusive education, financial literacy, careers, and health and safety.

Technological Devices:

Any device with windows 8 or newer will work on the software used for all courses.

For Online courses Electronic devices are necessary to access the course content and lessons. However, it is strongly recommended that students use other means such as paper and pencil when comprehension skills are required.

CWEC supports the use of technology to enhance learning, but the use of such electronic technology in the classroom is at the discretion of the teacher. Working together we can ensure the appropriate use of technology by all members of our school community.