Canterbury High School

Ottawa-Carleton District School Board

Mathematics Department

Semester I – 2010 /11 – Course Outline

Course Title: Foundations of Mathematics	**Grade Level: 10**
Course Code: MFM2P	**Credit Value: 1.0**
Prerequisite: MFM1P OR MPM1D	

Teachers: Miss Majerovich

Course Overview 110 hours

This course enables students to consolidate their understanding of linear relations and extend their problem-solving and algebraic skills through investigation, the effective use of technology, and hands-on activities. Students will develop and graph equations in analytic geometry; solve and apply linear systems, using real-life examples; and explore and interpret graphs of quadratic relations. Students will investigate similar triangles, the trigonometry of right triangles, and the measurement of three-dimensional figures. Students will consolidate their mathematical skills as they solve problems and communicate their thinking.

Strands:

Course Expectations

As students work through the course they will develop a set of skills that will support lifelong learning in mathematics. These skills are a set of seven mathematical processes that are embedded throughout all of the course expectations; they are, problem-solving, reasoning and proving, reflecting, selecting tools and computational strategies, connecting, representing, and communicating. This course will provide students with rich problem-solving opportunities that will help the student develop and apply these processes.

A. Measurement and Trigonometry

By the end of this course, students will:

- use their knowledge of ratio and proportion to investigate similar triangles and solve problems related to similarity;
- solve problems involving right triangles, using the primary trigonometric ratios and the Pythagorean theorem;
- solve problems involving the surface areas and volumes of three-dimensional figures, and use the imperial and metric systems of measurement.

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B. Modelling Linear Relations

By the end of this course, students will:

- manipulate and solve algebraic equations, as needed to solve problems;
- graph a line and write the equation of a line from given information;
- solve systems of two linear equations, and solve related problems that arise from realistic situations.

C. Quadratic Relations in the Form $y=ax^2+bx+c$

By the end of this course, students will:

- manipulate algebraic expressions, as needed to understand quadratic relations;
- identify characteristics of quadratic relations;
- solve problems by interpreting graphs of quadratic relations.

Units of Study

1. Similar Triangles (~2 weeks)
   Similar triangles are investigated using students' prior knowledge of ratio and proportion and triangle geometry. The Pythagorean Theorem is reviewed as it relates to similarity and solving for lengths of triangle sides. A variety of problems from real-life situations are examined.

2. Trigonometry (~2 weeks)
   Similarity as it pertains to right triangles is reviewed. The three primary trigonometric ratios (tangent, cosine, and sine) are used to solve problems in finding lengths and angles in right triangles.

3. Equations of Lines (~3 weeks)
   Slope is connected to the tangent ratio. Comparisons are made of lines and their characteristics (i.e., slope and y-intercept). Comparisons are also made between linear relations and quadratic relations. Students will write equations of lines from graphs and draw graphs from equations of lines. Students will also review the solving of equations to solve problems.

4. Graphical Models and Solutions (~2 weeks)
   The characteristics of linear and quadratic relations will be reviewed. Problem-solving using graphs from real-life situations will be performed as well as solving problems by interpreting a system of linear equations.

5. Linear Systems (~3 weeks)
   Solving systems of linear equations using the methods of elimination and substitution will be investigated. Students will determine the most appropriate method for each situation. A variety of real-life problems will be solved using systems of linear equations.

6. Surface Area and Volume (~3 weeks)
   Problems involving surface area and volume of three-dimensional figures will be investigated. The metric and imperial systems of measure will be reviewed and used in the solutions. Students will manipulate algebraic equations to solve for unknown dimensions required in solving problems.

7. Quadratic Relations of the Form $y=ax^2 + bx + c$ (~3 weeks)
   Students will determine an algebraic model for problems involving quadratic relations. They will identify the characteristics of quadratic relations. They will solve real-life problems involving quadratic relations.

Teaching Strategies

Students will have the opportunity to learn in a variety of ways; individually, cooperatively, investigative, teacher directed class discussion and notes, visual aids and manipulatives (e.g., algebra tiles, paper models).

Assessment and Evaluation Strategies

Student achievement will be monitored through the use of formative assessments in the form of quizzes, assignments, observations. Feedback on these assessments will provide the student with information to determine their level of understanding of the concepts. Student achievement will be recorded through the use of quizzes, tests, assignments/tasks. The percentage grade will represent the quality of the student's overall achievement of the expectations for the course and reflect the corresponding level of achievement as described in the achievement chart.

Evaluation Summary

Term Evaluation (70%) comprised of:

a)	Knowledge and Understanding (understand the concepts and computational skills of specific expectations)	- 24.5%
b)	Application (knowing when and how to use appropriate tools and concepts to solve problems)	- 24.5%
c)	Thinking (being able to use critical and creative thinking skills to solve problems, connect ideas from other strands)	- 10.5%
d)	Communication (reflect and express through writing a mathematical solution or concept)	- 10.5%

Summative Evaluation (30%) comprised of:

a)	Board-wide Summative Task (problems using a variety of tools)	- 15%
b)	Board-wide Examination	- 15%

References

www.edu.gov.on.ca/eng/curriculum/secondary/math910curr.pdf

Student Resources / Texts

1. Mathematics 10: Applying the Concepts, McGraw-Hill Ryerson, 2000

2. TIPS4RM (Targeted Implementation and Planning Supports for Revised Mathematics) – 10P
   http://www.edu.gov.on.ca/eng/studentsuccess/lms/tips4rm.html