Canterbury High School

Ottawa-Carleton District School Board

Mathematics Department

Semester I – 2010 / 11 – Course Outline

Course Title: Foundations of Mathematics	**Grade Level: 9**
Course Code: MFM1P	**Credit Value: 1.0**
Prerequisite: Grade 8 Mathematics	

Teachers: K. Evans

Course Overview 110 hours

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 the 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.

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. Number Sense and Algebra

By the end of this course, students will:
1. solve problems involving proportional reasoning;
2. simplify numerical and polynomial expressions in one variable, and solve simple first-degree equations.

B. Linear Relations

By the end of this course, students will:
1. apply data-management techniques to investigate relationships between two variables;
2. demonstrate an understanding of the characteristics of a linear relation;
3. connect various representations of a linear relation.

C. Measurement and Geometry

By the end of this course, students will:

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

Units of Study

1. Measurement: 2-D and 3-D (~2 weeks)
   Review perimeter and area of composite 2-D shapes. Develop formulas of 3-D figures and examine the Pythagorean Theorem. Numerical expressions and exponents will be simplified.

2. Measurement: Optimization (~2 weeks)
   Optimization of rectangles. Using tables to graph scatter plots and finding lines of best fit. Substituting into and solving equations.

3. Exploring Relationships: Lines and Curves of Best Fit (~2 weeks)
   Investigate data and determine the relationships between variables. Use lines and curves of best fit to predict and solve problems. Use data to investigate first differences to determine linear or non-linear relations.

4. Proportional Reasoning: Ratio, Rate, and Proportion (~2 weeks)
   Use of ratio, rate, and proportion to solve problems involving proportional reasoning. Investigation of percent and decimals in a variety of contexts.

5. Constant Rate of Change, Initial Condition, Direct and Partial Variation (~2 weeks)
   Use rate of change to calculate distance time graphs. Linear graphing examined using words and algebra. Graph lines using initial value and constant rate of change. Direct and partial variation also determined.

6. Multiple Representations of Linear Relations (~2 weeks)
   Determine solutions to linear equations graphically, numerically, and algebraically. Examine points of intersection and compare models.

7. Algebraic Models of Linear Relations (~2 weeks)
   Review first differences, all relationships, and make connections among numerical, graphical, and algebraic models.

8. Plane Geometry (~2 weeks)
   Plane geometry concepts investigated to find the relationships between angles formed by parallel lines cut by a transversal and interior and exterior angles of triangles and quadrilaterals. Some properties of sides and diagonals of quadrilaterals determined.

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., geometric shapes, algebra tiles).

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)	- 30%
b)	Application (knowing when and how to use appropriate tools and concepts to solve problems)	- 20%
c)	Thinking (being able to use critical and creative thinking skills to solve problems, connect ideas from other strands)	- 5%
d)	Communication (reflect and express through writing a mathematical solution or concept)	- 15%

Summative Evaluation (30%) comprised of:

a)	Summative Task (problems using a variety of tools)	- 10%
b)	Examination	- 20%

References

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

Student Resources / Texts

1. Targeted Implementation and Planning Supports for Revised Mathematics (http://www.edu.gov.on.ca/eng/teachers/studentsuccess/index.html)

2. Mathematics Applying the Concepts 9, McGraw-Hill Ryerson

3. Pearson Math 9, Pearson Education