**MPM1D Grade 9 Math Course Outline**

**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.

**Units description and Expectations:** (suggested time)

**Number Sense and Algebra, 29 h:**

• 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.

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| --- | --- | --- |
| Chapter | Title | pages |
| 1 | Mathematical Processes | 2 - 37 |
| 2 | Relations | 38 - 98 |
| 3 | Polynomials | 100 - 180 |

**Linear relations 27 h:**

• 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.

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| --- | --- | --- |
| Chapter | Title | Pages |
| 4 | Equations | 182 - 233 |
| 5 | Modelling with graphs | 234 - 290 |

**Analytic Geometry, 26h:**

• 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.

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| Chapter | Title | Pages |
| 6 | Analyse Linear Relations | 292 - 358 |

**Measurements and Geometry, 28h:**

• 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.

|  |  |  |
| --- | --- | --- |
| Chapter | Title | Pages |
| 7 | Geometric Relationships | 360 - 410 |
| 8 | Measurement Relationships | 412 - 472 |
| 9 | Optimizing Measurements | 474 - 522 |

Resources:

* Textbook: Principles of Mathematics, 9 (McGraw-Hill), 2006 (Replacement Cost: $100)
* www.khanaacademy.org – A great site with lots of videos to help understand concepts
* www.homeworkhelp.ilc.org - A site that allows you to get help from a live tutor online for free
* Before school (come early and ask some questions before class)

**Teaching and Learning Strategies:**

Samples of some of the teaching / learning strategies used during this course are:

* Problem Solving

Students will be provided with ample problem-solving strategies and will be encouraged to apply them in many different scenarios encountered throughout the course.

* Communication

The ability to communicate ideas correctly and succinctly, using vocabulary and terminology related to the discipline, is crucial in today’s world. The students will be encouraged to communicate their ideas and opinions in several forms of media including journals, presentations and demonstrations.

* Interactive Demonstrations

Demonstrations bring the lessons to life, by taking the theories and laws out of the textbooks and into reality. Demonstrations will be one of the primary tools for gaining the students attention and igniting their curiosity.

**Assessment and Evaluation of Student Performance:**

**Basic Considerations**

The primary purpose of assessment and evaluation is to improve student learning.

Assessment is the process of gathering information from a variety of sources (including assignments, day-to-day observations, conversations or conferences, demonstrations, projects, performances, and tests) that accurately reflects how well a student is achieving the curriculum expectations in a course. As part of assessment, teachers provide students with descriptive feedback that guides their efforts towards improvement.

Evaluation refers to the process of judging the quality of student work on the basis of established criteria, and assigning a value to represent that quality.

Assessment and evaluation will be based on the provincial curriculum expectations and the achievement levels outlined in this document. In order to ensure that assessment and evaluation are valid and reliable, and that they lead to the improvement of student learning, teachers must use assessment and evaluation strategies that:

• address both what students learn and how well they learn;

• are based both on the categories of knowledge and skills and on the achievement level descriptions given in the achievement chart;

• are varied in nature, administered over a period of time, and designed to provide opportunities for students to demonstrate the full range of their learning;

• are appropriate for the learning activities used, the purposes of instruction, and the needs and experiences of the students;

• are fair to all students;

• accommodate students with special education needs, consistent with the strategies outlined in their Individual Education Plan;

• accommodate the needs of students who are learning the language of instruction;

• ensure that each student is given clear directions for improvement;

• promote students’ ability to assess their own learning and to set specific goals;

• include the use of samples of students’ work that provide evidence of their achievement;

• are communicated clearly to students and parents at the beginning of the school year and at other appropriate points throughout the school year

Evaluation:

The final mark for academic achievement will be based on the achievement chart of Math from the Ontario Curriculum, grades 9 and 10, 2008. 70% of the grade will be gathered from evidence throughout the course, with special consideration given to the most frequent and the most recent and 30% will be gathered at or near the end of the term.

**Achievement Chart: Science, Grades 9-12**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categories | 50 – 59%  Level 1 | 60 – 69%  Level 2 | 70 -79%  Level 3 | 80 – 100%  Level 4 |
| Student |  |  |  |  |
| Knowledge of content (e.g., facts, terms, procedural skills, use of tools)  Understanding of Mathematic Concepts | demonstrates limited knowledge of content  demonstrates limited understanding of content | demonstrates some knowledge of content  demonstrates some understanding of content | demonstrates limited understanding of content  demonstrates considerable understanding of content | demonstrates thorough knowledge of content  demonstrates thorough understanding of content |
| Use of initiating and planning skills and strategies (e.g., formulating questions, identifying the problem, developing hypotheses, selecting strategies and resources, developing plans)  Use of processing skills and strategies (e.g., performing and recording, gathering evidence and data, observing, manipulating materials and using equipment safely, solving equations, proving)  Use of critical/creative thinking processes, skills, and strategies (e.g., analysing, interpreting, problem solving, evaluating, forming and justifying conclusions on the basis of evidence) | uses initiating and planning skills and strategies with limited effectiveness  uses processing skills and strategies with limited effectiveness  uses critical/ creative thinking processes, skills, and strategies with limited effectiveness | uses initiating and planning skills and strategies with some effectiveness  uses processing skills and strategies with some effectiveness  uses critical/ creative thinking processes, skills, and strategies with some effectiveness | uses initiating and planning skills and strategies with considerable effectiveness  uses processing skills and strategies with considerable effectiveness  uses critical/ creative thinking processes, skills, and strategies with considerable effectiveness | uses initiating and planning skills and strategies with high degree of effectiveness  uses processing skills and strategies with high degree of effectiveness  uses critical/ creative thinking processes, skills, and strategies with high degree of effectiveness |
| Communication for different audiences (e.g., peers, adults) and purposes (e.g., to inform, to persuade) in oral, visual, and/or written forms  Use of conventions, vocabulary, and terminology of the discipline in oral, visual, and/or written forms (e.g., symbols, formulae, scientific notation, SI units) | communicates for different audiences and purposes with limited effectiveness  uses conventions, vocabulary, and terminology of the discipline with limited effectiveness | communicates for different audiences and purposes with some effectiveness  uses conventions, vocabulary, and terminology of the discipline with some effectiveness | communicates for different audiences and purposes with considerable effectiveness  uses conventions, vocabulary, and terminology of the discipline with considerable effectiveness | communicates for different audiences and purposes with high degree of effectiveness  uses conventions, vocabulary, and terminology of the discipline with high degree of effectiveness |
| Application of knowledge and skills (e.g., concepts and processes, safe use of equipment, scientific investigation skills) in familiar contexts  Transfer of knowledge and skills (e.g., concepts and processes, safe use of equipment, scientific investigation skills) to unfamiliar contexts  Making connections between science, technology, society, and the environment (e.g., assessing the impact of science on technology, people and other living things, and the environment)  Proposing courses of practical action to deal with problems relating to science, technology, society, and the environment | applies knowledge and skills in familiar contexts with limited effectiveness  transfers knowledge and skills to unfamiliar contexts with limited effectiveness  makes connections between science, technology, society, and the environment with limited effectiveness  proposes courses of practical action of limited effectiveness | applies knowledge and skills in familiar contexts with some effectiveness  transfers knowledge and skills to unfamiliar contexts with some effectiveness  makes connections between science, technology, society, and the environment with some effectiveness  proposes courses of practical action of some effectiveness | applies knowledge and skills in familiar contexts with considerable effectiveness  transfers knowledge and skills to unfamiliar contexts with considerable effectiveness  makes connections between science, technology, society, and the environment with considerable effectiveness  proposes courses of practical action of considerable effectiveness | applies knowledge and skills in familiar contexts with high degree of effectiveness  transfers knowledge and skills to unfamiliar contexts with high degree of effectiveness  makes connections between science, technology, society, and the environment with high degree of effectiveness  proposes highly effective courses of practical action |

**Strategies of Assessment and Evaluation of Student’s Performance:**

Assessment is the process of gathering information from a variety of sources that accurately reflects on how well a student is achieving both specific and overall curriculum expectations in a course.

Assessment **FOR** learning and Assessment **AS** learning: As part of assessment, teachers and peers will provide students with descriptive feedback that guide their effort towards improvement (assessment FOR learning) as wellas guides them in assessing their own progress (assessment AS learning).

Assessment **OF** learning: Evaluation is based on assessment of learning and focuses on student’s achievement of overall expectations. A single assessment of learning may include one or more of the four knowledge and skills categories. Assessment of learning in this course will be continuous throughout the term, will follow opportunities for students to improve their understanding and will include a variety of assessment methods. Assessment of each student’s learning is done independently and by the teacher.

**Mark Breakdown:**

The overall course is broken into term work and final exam:

|  |  |
| --- | --- |
| Section | Percentage |
| Term work   * Quizzes * Tests * Assignments * Midterm | 70% |
| Final Exam | 30% |

All the marks are broken into skill categories as follow:

|  |  |
| --- | --- |
| Skill category | Percentage |
| Knowledge and understanding | 30% |
| Thinking | 20% |
| Communication | 20% |
| Application | 30% |