Iroquois Ridge High School

MDM4U1 - Data Management - Course Outline

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	Workroom 307	*Classroom 115*

This course broadens students' understanding of mathematics as it relates to managing data. Students will apply methods for organizing and analysing large amounts of information; solve problems involving probability and statistics; and carry out a culminating investigation that integrates statistical concepts and skills. Students will also refine their use of the mathematical processes necessary for success in senior mathematics. Students planning to enter university programs in business, the social sciences, and the humanities will find this course of particular interest.

What will you be expected to learn? (Key Learnings)

In this course, you will be expected to provide evidence that you can:

PROCESS EXPECTATIONS

- be actively engaged in the following seven processes which are integrated into all areas of the course: *problem solving, reasoning and proving, reflecting, selecting tools and computational strategies, connecting, representing, and communicating.*

COUNTING AND PROBABILITY

- solve problems involving the probability of an event or a combination of events for discrete sample spaces;
- solve problems involving the application of permutations and combinations to determine the probability of an event.

PROBABILITY DISTRIBUTIONS

- demonstrate an understanding of discrete probability distributions, represent them numerically, graphically, and algebraically, determine expected values, and solve related problems from a variety of applications;
- demonstrate an understanding of continuous probability distributions, make connections to discrete probability distributions, determine standard deviations, describe key features of the normal distribution, and solve related problems from a variety of applications.

ORGANIZATION OF DATA FOR ANALYSIS

- demonstrate an understanding of the role of data in statistical studies and the variability inherent in data, and distinguish different types of data;
- describe the characteristics of a good sample, some sampling techniques, and principles of primary data collection, and collect and organize data to solve a problem.

STATISTICAL ANALYSIS

- analyse, interpret, and draw conclusions from one-variable data using numerical and graphical summaries;
- analyse, interpret, and draw conclusions from two-variable data using numerical, graphical, and algebraic summaries;
- demonstrate an understanding of the applications of data management used by the media and the advertising industry and in various occupations.

CULMINATING DATA MANAGEMENT INVESTIGATION

- design and carry out a culminating investigation* that requires the integration and application of the knowledge and skills related to the expectations of this course;
- communicate the findings of a culminating investigation and provide constructive critiques of the investigations of others.

You will be expected to demonstrate your understanding of these key learnings through your knowledge, thinking, communication and application of the learning.

Knowledge Emphasizes the ability to recall factual information, recognize fundamental concepts and the foundational skills of the subject/discipline.	15%	Knowledge of content (e.g., facts, terms, procedural skills, use of tools) and understanding of mathematical concepts. These may be assessed through quizzes, tests, oral questions and answers, practice question assignments, etc.
Thinking Emphasizes the thinking skills used in thinking processes to demonstrate the student's understanding of information they have processed.	20%	Use of *planning skills*: understanding the problem (e.g., formulating and interpreting the problem, making conjectures) and making a plan for solving the problem. Use of *processing skills*: carrying out a plan (e.g., collecting data, questioning, testing, revising, modelling, solving, inferring, forming conclusions) and looking back at the solution (e.g., evaluating reasonableness, making convincing arguments, reasoning, justifying, proving, reflecting). Use of *critical/creative thinking processes* (e.g., problem solving, inquiry). These may be assessed through open-ended investigations, inquiry tasks, oral interview, projects, verbal defense, observation of process, etc.
Communication Emphasizes the clear, precise and effective use of oral, written and visual language to communicate the student's understanding of information and ideas	15%	*Expression and organization of mathematical thinking* (e.g., clarity of expression, logical organization), using oral, visual, and written forms (e.g., pictorial, graphic, dynamic, numeric, algebraic forms; concrete materials). *Communication for different audiences* (e.g., peers, teachers) *and purposes* (e.g., to present data, justify a solution, express a mathematical argument) in oral, visual, and written forms. *Use of conventions, vocabulary, and terminology* of the discipline (e.g., terms, symbols) in oral, visual, and written forms. These may be assessed through journals, written explanations or reports, teacher-student conferences, solution presentations, problem form scores, etc.
Application Emphasizes the application and integration of knowledge, skills, processes and techniques to produce evidence of the student's understanding.	20%	Application of knowledge and skills in familiar contexts and transfer of knowledge and skills to new contexts. Making connections within and between various contexts (e.g., connections between concepts, representations, and forms within mathematics; connections involving use of prior knowledge and experience; connections between mathematics, other disciplines, and the real world). These may be assessed with rich tasks, open-ended problems, real-world projects and applications, etc.

How will you demonstrate your learning? (what you say, write and do)

70% of your learning will be assessed through:	*Formative and Summative Evaluations*	
30% of your learning will be assessed at the end of the course (last four weeks of the semester)through:	*Final Evaluation 10%*	INQUIRY PERFORMANCE TASK consisting of a culminating project on a topic or issue or significance that requires the integration and application of the expectations of the course. Students will present their project to an audience and critique the projects of others. This task is based on the course project strand "Integration of the Techniques of Data Management". It is suggested that this culminating project be addressed appropriately throughout the course both to assist students in the completion of their project and to provide sufficient time for reflection and thinking. Therefore, a portion of the 70% grade (in addition to the 10% for this task) may be attached to this culminating project at the teacher's discretion to represent work done during the course for this task.
	Final Evaluation 20 %	FINAL EXAMINATION consisting of a variety of question types (e.g. short answer, multiple choice, extended tasks) sampling all strands and categories of 2.5 hours duration or less.
100% of your learning will be recorded as:	*Final Grade on Report Card*	

Your skills as a learner will be assessed in the way you demonstrate:

	Learning Skill "Look Fors"
Working Independently	• accomplishes tasks independently • accepts responsibility for completing tasks • follows instructions • regularly completes assignments on time and with care • demonstrates self-direction in learning • independently selects, evaluates, and uses appropriate learning materials, resources, and activities • demonstrates persistence in bringing tasks to completion • uses time effectively • uses prior knowledge and experience to solve problems and make decisions • reflects on learning experiences
Teamwork	• works willingly and cooperatively with others • shares resources, materials, and equipment with others • responds and is sensitive to the needs and welfare of others • solves problems collaboratively • accepts various roles, including leadership roles • takes responsibility for his or her own share of the work to be done • works to help achieve the goals of the group or the class • helps to motivate others, encouraging them to participate • contributes information and ideas to solve problems and make decisions • questions the ideas of the group to seek clarification, test thinking, or reach agreement • shows respect for the ideas and opinions of others in the group or class • listens attentively, without interrupting • in discussions, paraphrases points of view and asks questions to clarify meaning and promote understanding • recognizes the contribution of group members by means of encouragement, support, or praise • seeks consensus and negotiates agreement before making decisions

Organization	• organizes work when faced with a number of tasks • devises and follows a coherent plan to complete a task • follows specific steps to reach goals or to make improvements • revises steps and strategies when necessary to achieve a goal • manages and uses time effectively and creatively • demonstrates ability to organize and manage information • follows an effective process for inquiry and research • uses appropriate information technologies to organize information and tasks
Work Habits/Homework	• completes homework on time and with care • puts forth consistent effort • follows directions • shows attention to detail • uses materials and equipment effectively • begins work promptly and uses time effectively • perseveres with complex projects that require sustained effort • applies effective study practices
Initiative	• seeks out new opportunities for learning • responds to challenges and takes risks • demonstrates interest and curiosity about concepts, objects, events, and resources • seeks necessary and additional information in print, electronic, and media resources • identifies problems to solve, conducts investigations, and generates questions for further inquiry • requires little prompting to complete a task, displaying self-motivation and self-direction • approaches new learning situations with confidence and a positive attitude • develops original ideas and devises innovative procedures • attempts a variety of learning activities • seeks assistance when needed • uses information technologies in creative ways to improve learning for self or others

How will you learn and get help when you are not learning?
Lunch and after school with Mr. Gallant in 307 and Mr. Boulton in 112, math clinic (second half of lunch, rm 306), and purplemath.com.

	What are you expected to learn?	**How will you demonstrate what you've learned?**	
Units	***Key Learnings Focus***	***Your learning will be demonstrated by what you say, write and do.***	***Texts, Materials & Learning Opportunities***
1	Counting And Probability	Journal, Homework, Assignment, Test	Mathematics of Data Management, McGraw-Hill; Internet sites; course website
2	Probability Distributions	Journal, Homework, Assignment, Test	Mathematics of Data Management, McGraw-Hill; Internet sites; course website
3	Organization Of Data For Analysis	Journal, Homework, Assignment, Test	Mathematics of Data Management, McGraw-Hill; Internet sites; course website
4	Statistical Analysis	Journal, Homework, Assignment, Test	Mathematics of Data Management, McGraw-Hill; Internet sites; course website
5	Culminating Data Management Investigation	Written Report, Presentation, Concept Map, Annotated Bibliography	Mathematics of Data Management, McGraw-Hill; Internet sites; course website