



North Vancouver Online Learning

Course Plan: Math 12 Foundations

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COURSE DESCRIPTION:

Mathematics 12 Foundations (Math 12 F) is one of the BC Provincial Mathematics 12 courses, offered in an online setting. The course follows the BC Provincial curriculum and satisfies the requirements for graduation and entrance into many post-secondary institutions or programs. This pathway is designed to provide students with the mathematical understandings and critical-thinking skills identified for post-secondary studies in programs that do not require the study of theoretical calculus. For the complete Ministry Curriculum Math 12 Foundations document, go to:

<https://curriculum.gov.bc.ca/curriculum/mathematics/12/foundations-of-mathematics>

BIG IDEAS:

The Big Ideas consist of generalizations, principles, and the key concepts important in an area of learning. They reflect the “Understand” component of the Know-Do-Understand model of learning. The Big Ideas represent what students will understand at the completion of the curriculum for their grade level. They are intended to endure beyond a single grade level and contribute to future understanding. Students will explore and understand the following four Big Ideas throughout the Math 12 Foundations course:

Probabilistic thinking informs decision making in situations involving chance and uncertainty.

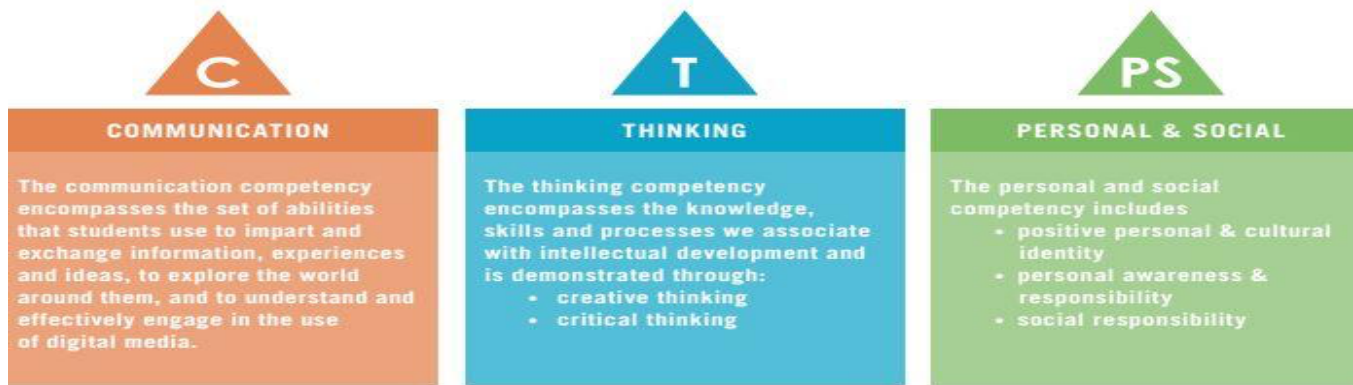
Modelling data requires an understanding of a variety of functions.

Mathematical analysis informs financial **decisions**.

Through **explorations** of spatial relationships, we can develop a geometrical appreciation of the world around us.

CORE COMPETENCIES:

A Core Competency is a skill that all learners need to have to be successful in all aspects of their life. There are 3 core competencies: Communication (Communicating & Collaborating), Thinking (Critical Thinking & Creative Thinking), and Personal & Social (Positive Personal & Cultural Identity, Personal Awareness & Responsibility, and Social Responsibility).



COURSE EXPECTATIONS:

- The self-paced nature of the course demands that students manage their time effectively to complete the course by the deadline (June 1st or as determined by your program requirements). Successful students should engage in coursework for at least one hour each day.
- Students must successfully attempt all activities in the course in order to receive a passing grade, including: unit quizzes, unit assignments, unit tests, review packages, performance tasks, reflections, the portfolio, and the final exam.
- Students must pass a minimum of half of the Unit Tests in order to receive an overall passing grade in this course.
- The course material is run in Moodle, which is an interactive Learning Module System. This course teaches the material through interactive video lessons with complete detailed explanations to the content. Each lesson includes a note taking supplement, practice homework, and video solutions to the practice assignments. All content, quizzes, review materials and additional studying resources are found in the course in Moodle.
- Students should take care that their communication with the instructor and with other students, through email, Moodle-messaging, and/or forums, is course related, clear in message and respectful in tone.
- This course is mainly to be completed by distance, although unit tests and the final exam must be completed under the supervision of a Online Learning Teacher. Unit Tests must be completed at either the Mountainside OL Center or another North Vancouver District High School OL center. The Final Exam must be completed at the Mountainside OL Center. Assignments and online quizzes may be completed at home.

- A graphing calculator is required for this course. A basic TI-83 model is sufficient.
- It is the responsibility of the student to become familiar with any prospective Post Secondary Institution requirements regarding completion date and grade requirements.
- **Course work must be original; students are expected to complete their own work on an individual basis unless otherwise stated by the teacher. Any student who plagiarizes the work of another or does not do the work themselves, either in test situations or on major assignments, will face disciplinary action. This may range from receiving a zero on an assignment or test to disciplinary action by the NVOL Administration.**

LEARNING STANDARDS: Curricular Competencies

Students are expected to be able to do the following:

Reasoning and modelling

- Develop **thinking strategies** to solve puzzles and play games
- Explore, **analyze**, and apply mathematical ideas using **reason**, **technology**, and **other tools**
- **Estimate reasonably** and demonstrate **fluent, flexible, and strategic thinking** about number
- **Model** with mathematics in **situational contexts**
- **Think creatively** and with **curiosity and wonder** when exploring problems

Understanding and solving

- Develop, demonstrate, and apply mathematical understanding through play, story, **inquiry**, and problem solving
- **Visualize** to explore and illustrate mathematical concepts and relationships
- Apply **flexible and strategic approaches to solve problems**
- Solve problems with **persistence and a positive disposition**
- Engage in problem-solving experiences **connected** with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures

Communicating and representing

- **Explain and justify** mathematical ideas and **decisions in many ways**
- **Represent** mathematical ideas in concrete, pictorial, and symbolic forms
- Use mathematical vocabulary and language to contribute to **discussions** in the classroom
- Take risks when offering ideas in classroom **discourse**

Connecting and reflecting

- **Reflect** on mathematical thinking
- **Connect mathematical concepts** with each other, other areas, and personal interests
- Use **mistakes as opportunities to advance learning**
- **Incorporate** First Peoples worldviews, perspectives, **knowledge**, and **practices** to make connections with mathematical concepts

Student Substantive Activities will cover the following **Learning Outcomes (Curricular Competencies)**.

- Explore, **analyze**, and apply mathematical ideas using **reason, technology, and other tools**
- Apply **flexible and strategic approaches to solve problems**
- **Explain and justify** mathematical ideas and **decisions** in **many ways**
- **Model** with mathematics in **situational contexts**

These are 4 of the 18 learning outcomes in the course curriculum, which comprises 22% of the course Learning Outcomes/Activities. (4/18 =22%)

LEARNING STANDARDS: Course Content

Students are expected to know the following:

- geometric explorations:
 - **constructions**
 - **conics**
 - **fractals**
- graphical **representations** of polynomial, logarithmic, exponential, and sinusoidal functions
- **regression analysis**
- **combinatorics**
- **odds, probability**, and expected value
- **financial planning**

UNIT OVERVIEWS:

Unit 1 & 2: Financial Literacy (Investing & Borrowing Money)

Big Idea: *Mathematical analysis informs financial **decisions**.*

Core Competency Focus: *Thinking, Personal/Social*

First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: Students will study financial planning which involves topics such as: developing a personal financial portfolio, mortgages, risk, changing interest rates and/or payments, credit cards, and exploring banking options and financial markets. Students are expected to demonstrate financial literacy understanding both algebraically and by using technology.

Unit 3: Combinatorics

Big Idea: *Modelling* data requires an understanding of a variety of functions.

Core Competency Focus: *Thinking*

First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: Students will study permutations, combinations, pathways, and Pascal's Triangle. Students are expected to demonstrate their understanding of Combinatorics content both algebraically and through using technology.

Unit 4: Probability

Big Idea: *Probabilistic thinking* informs decision making in situations involving chance and uncertainty.

Core Competency Focus: *Thinking, Personal/Social*

First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: Students will study mutually exclusive and non-mutually exclusive events, as well as conditional and binomial probability. Students will understand how mutually exclusive and non-mutually exclusive events are connected to Venn diagrams, and students are also expected to pictorially demonstrate these events using Venn diagrams.

Unit 5: Polynomial Functions

Big Idea: *Modelling* data requires an understanding of a variety of functions.

Core Competency Focus: *Thinking/Communication*

First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: Students will study various polynomial graphs types such as quadratic and cubic functions. Students are expected to use technology to demonstrate graphical representations, apply appropriate regression models, as well as use graph characteristics to identify polynomial functions.

Unit 6 : Exponential & Logarithmic Functions

Big Idea: *Modelling* data requires an understanding of a variety of functions.

Core Competency Focus: *Thinking/Communication*

First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: Students will study exponential and logarithmic functions. Students are expected to use technology to demonstrate graphical representations, apply appropriate regression models, as well as use graph characteristics to identify exponential and logarithmic functions.

Unit 7 : Sinusoidal Functions

Big Idea: *Modelling data requires an understanding of a variety of functions.*

Core Competency Focus: *Thinking/Communication*

First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: Students will study sinusoidal functions. Students are expected to use technology to demonstrate graphical representations, apply appropriate regression models, as well as use graph characteristics to identify sinusoidal functions.

Unit 8 : Conics

Big Idea: *Through explorations of spatial relationships, we can develop a geometrical appreciation of the world around us.*

Core Competency Focus: *Thinking, Personal/Social*

First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: Students will explore conics and conic sections. They will study topics such as locus definition, constructions, and applications relating to conics.

Unit 9 : Constructions & Fractals

Big Idea: *Through explorations of spatial relationships, we can develop a geometrical appreciation of the world around us.*

Core Competency Focus: *Thinking, Personal/Social*

First Peoples Principle of Learning: *Learning involves patience and time.*

Unit Overview: Students will study topics related to constructions such as: perpendicular bisectors, tangents, polygons, tessellations, and geometric art. Students will connect fractals with nature, understand fractals as an iteration of a simple instruction, as well as construct and analyze models of fractals, such as Cantor's Dust, Serpinski's Triangle, and Koch's Snowflake.

STUDENT LEARNING ACTIVITIES AND STRATEGIES:

- online lessons
- online practice homework
- paper-based unit assignments
- online lessons quizzes
- unit tests and final exam
- portfolio – collection of notes (optional)
- reflective writing
- performance tasks (grasp tasks)

ASSESSMENT:

The course will include many formative assessment opportunities where students will receive teacher feedback and also have the opportunity to incorporate self-reflection and self-assessment tools. Summative assessment will be used on individual performance tasks that are incorporated throughout the units. After each unit test, the teacher will provide feedback based on criteria and performance standards. The North Vancouver Curriculum Hub Principles of Assessment - <http://nvsc44curriculumhub.ca/assessment/>

Formative

- practice homework/video solutions, self-marking of unit assignments, online lesson quizzes, review exercises – checking for completion and understanding of lessons.
- teacher/student appointments to discuss work and progress

Summative:

- unit assignments, unit tests, performance tasks, final exam, portfolio (optional) – written feedback, rubric assessment and grade

EVALUATION:

Based on performance standards and criteria as outlined in each assignment:

Assessment	Percentage of Final Mark
Unit Assignments	~20%
Unit Quizzes	~9%
Unit Tests	~51%
Portfolio (optional)	~10%
Final Exam	~10%
Course Total	100%

RESOURCES:

The required readings and assignments are provided online for each lesson. Students must have access to a computer with internet capabilities, as well as to a functioning printer. The OL center at Mountainside is available for students who do not have computer/printer access at home or who would like to meet with the teacher for support. There is no textbook required.

As of January 2018, all students must take a **NUMERACY EXAM** at least ONE time during grades 10 – 12. The Numeracy Exam is not necessarily based on Math 12 Foundations content, but rather based on foundational math skills.