



# North Vancouver Online Learning

**Course Plan: Math 11 Foundations**

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## **COURSE DESCRIPTION:**

Mathematics 11 Foundations (Math 11 F) is one of the BC Provincial Mathematics 11 courses, offered in an online setting. The course follows the BC Provincial curriculum and satisfies the requirements for graduation. Mathematics 11 Foundations is the second course in the pathway leading to the senior math requirement for entrance into many post secondary math and science based programs. For the complete Ministry Curriculum Math 11 Foundations document, go to:

<https://curriculum.gov.bc.ca/curriculum/mathematics/11/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 11 Foundations course:

**Similar** shapes and objects have proportional relationships that can be described, measured, and compared.

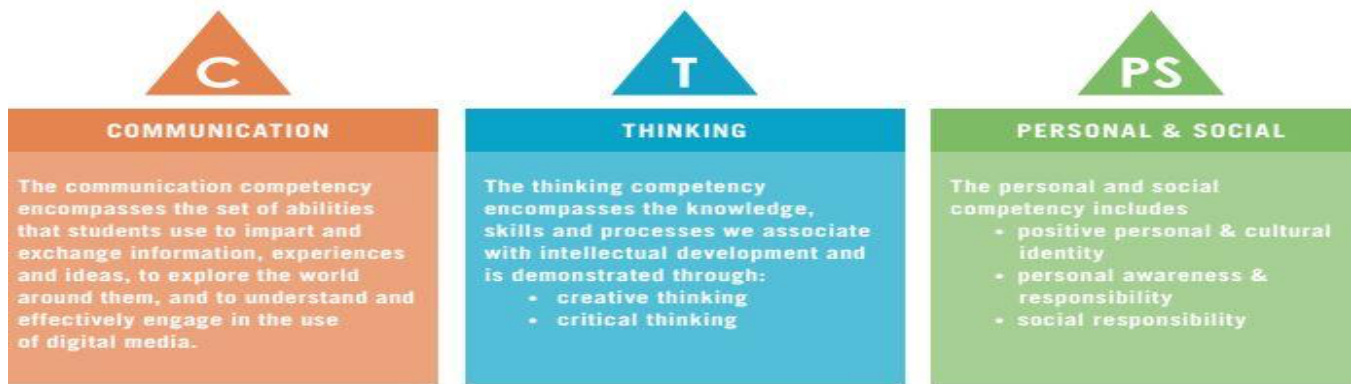
**Optimization** informs the decision-making process in situations involving extreme values.

**Logical reasoning** helps us discover and describe mathematical truths.

Statistical analysis allows us to notice, wonder about, and answer questions about **variation**.

## **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 1<sup>st</sup> 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 a passing grade overall 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.
- **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)**.

- Develop thinking strategies to solve puzzles and play games
- **Explain and justify** mathematical ideas and **decisions in many ways**
- Use mistakes as opportunities to advance learning

These are 3 of the 18 learning outcomes in the course curriculum, which comprises 16% of the course Learning Outcomes/Activities. (3/18 =16%)

## LEARNING STANDARDS: Course Content

*Students are expected to know the following:*

- forms of **mathematical reasoning**
- **angle relationships**
- **graphical analysis:**
  - **linear inequalities**
  - **quadratic functions**
  - **systems of equations**
  - **optimization**
- **applications of statistics**
- **scale models**
- **financial literacy:** compound interest, investments and loans

## UNIT OVERVIEWS:

### **Unit 1: Reasoning**

**Big Idea:** *Logical reasoning helps us discover and describe mathematical truths.*

**Core Competency Focus:** *Thinking*

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

**Unit Overview:** Students will study various forms of mathematical reasoning such as: inductive and deductive reasoning, logic, conjecturing, proofs, games/puzzle analysis, and counter-examples. Students will form predictions, generalizations, and conclusions drawn from experiences.

### **Unit 2: Scale & Scale Models**

**Big Idea:** *Similar shapes and objects have proportional relationships that can be described, measured, and compared.*

**Core Competency Focus:** *Thinking*

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

**Unit Overview:** Students will study scale models, enlargements and reductions of 2D and 3D objects, as well as the square-cube law. Students will compare the properties of similar objects (length, area, and volume).

### Unit 3: Properties of Angles & Triangles

**Big Idea:** *Similar shapes and objects have proportional relationships that can be described, measured, and compared.*

**Core Competency Focus:** Thinking

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

**Unit Overview:** Students will study angle relationships such as: properties, parallel lines, triangles and other polygons, and angle constructions. Students will demonstrate their mathematical thinking in step-wise justifications, such as geometric proofs.

### Unit 4: Systems of Linear Inequalities

**Big Idea:** *Optimization informs the decision making process in situations involving extreme values.*

**Core Competency Focus:** Thinking

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

**Unit Overview:** Students will study linear inequalities, systems of linear inequalities, and optimization. Students will be able to graph solution regions, as well as identify slope, intercepts, and intersection points of lines. Students will be expected to analyze graphs using technology. Students will investigate topics such as using feasible regions to optimize an objective function, maximizing profit while minimizing cost, and maximizing area or volume while minimizing perimeter.

### Unit 5 : Quadratic Functions & Equations

**Big Idea:** *Optimization informs the decision making process in situations involving extreme values.*

**Core Competency Focus:** Thinking

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

**Unit Overview:** Students will study quadratic functions and equations. Students will be able to graph quadratic functions, as well as identify characteristics of graphs such as slope, intercepts, end behaviour, maximum/minimum, vertex, and symmetry. Students will be expected to analyze graphs using technology.

### Unit 6 : Systems of Equations

**Big Idea:** *Optimization informs the decision making process in situations involving extreme values.*

**Core Competency Focus:** Thinking

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

**Unit Overview:** Students will study systems of equations which involve linear/quadratic systems, as well as quadratic/quadratic systems. Students are expected to analyze and create graphs using technology.

## Unit 7 : Probability & Statistics

**Big Idea:** *Statistical analysis allows us to notice, wonder about, and answer questions about **variation**.*

**Core Competency Focus:** *Thinking, Communication*

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

**Unit Overview:** Students will study the applications of statistics, such as: measures of central tendency, standard deviation, confidence intervals, z-scores, and distributions. Students will be introduced to the process of posing a question about an observed variation, collecting and interpreting data, and answering the question. Students will be expected to demonstrate their understanding of Probability & Statistics using technology.

## Unit 8 : Financial Literacy

**Big Idea:** *Logical reasoning helps us discover and describe mathematical truths.*

**Core Competency Focus:** *Thinking, Personal/Social*

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

**Unit Overview:** Students will study financial literacy topics such as compound interest, investments, buy/lease, and loans. Students are expected to explore investments/loans with regular payments using technology.

### **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

### **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 assessments 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://nvsd44curriculumhub.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, practice exercises/worksheets, final exam, portfolio (optional) – written feedback, rubric assessment and grade.

**EVALUATION:**

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

<b>Assessment</b>	<b>Percentage of Final Mark</b>
Unit Assignments	~20%
Unit Tests	~50%
Online Quizzes	~10%
Portfolio (optional)	~10%
Final Exam	~10%
<b>Course Total</b>	<b>100%</b>

**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 11 Foundations content, but rather based on foundational math skills.

Note: Students will need to pass at least half of the unit assessment tests in order to receive an overall passing grade in this course.