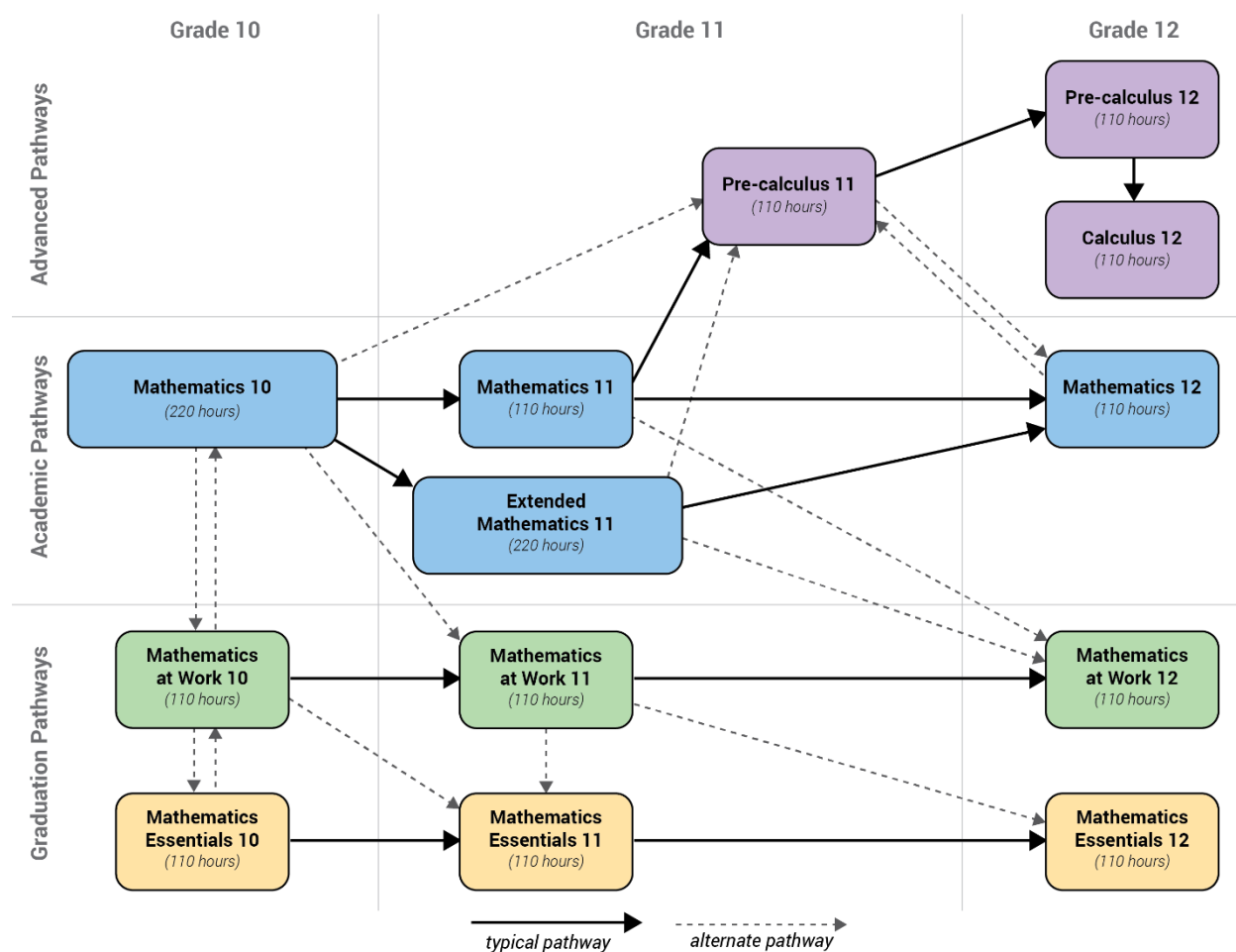# Mathematics Pathways

The Nova Scotia mathematics curriculum provides students the knowledge, skills, and understandings for post-secondary programs or direct entry into the workforce. High school mathematics courses are organized into four pathways: Academic, Pre-calculus, Mathematics at Work and Mathematics Essentials with each pathway being organized to provide specific mathematical contexts, concepts and skills. When choosing a pathway, students should choose a pathway that best fits their interests and plans after high school. For students entering Grade 10, Mathematics 10 provides the most flexibility for future courses. This would be a good choice for students unsure of their post-secondary plans. Students, parents, and educators are encouraged to research the admission requirements for post-secondary programs of study as they vary by institution and by year.

Senior High Mathematics Course Pathways (Effective 2021)

There are four main pathways for mathematics in Nova Scotia:

1. **Academic pathway (academic credit type):** Courses in this pathway prepare students to enter post-secondary academic programs that do not require pre-calculus for admission.
   Courses: Mathematics 10, Mathematics 11 (or Extended Mathematics 11) and Mathematics 12
2. **Pre-calculus pathway (advanced credit type):** Courses in this pathway prepare students to enter post-secondary academic programs that require pre-calculus for admission.
   This pathway branches off of the academic pathway.
   Courses: Pre-calculus 11 and Pre-calculus 12, Calculus 12

3. **Mathematics at Work pathway (graduation credit type):** Courses in this pathway prepare students to enter post-secondary programs that do not require academic mathematics (options at both community college and university) or who plan to enter the workforce directly after high school.
   Courses: Mathematics at Work 10, Mathematics at Work 11, and Mathematics at Work 12
4. **Mathematics Essentials pathway (graduation credit type):** Courses in this pathway are designed for students who intend to enter the workforce directly after graduation or do not plan to pursue post-secondary programs that require mathematics.
   Courses: Mathematics Essentials 10, Mathematics Essentials 11, and Mathematics Essentials 12

Grade 10 Mathematics Course Descriptions

Three mathematics courses are available at the grade 10 level:
- Mathematics 10: (220 hours), 2 academic credits
- Mathematics at Work 10: (110 hours), 1 graduation credit
- Mathematics Essentials 10: (110 hours), 1 graduation credit

Mathematics 10

(academic credit type, 2 credits, 220-hour course)

Mathematics 10 is an academic credit type high school mathematics course. Upon successful completion students will receive 2 academic credits; one in Mathematics 10 and another in math, science or technology.

It is recommended that students proceed to Mathematics 11 or Mathematics Extended 11 upon completion of Mathematics 10. In some cases students may choose a course other than Mathematics 11 or Extended Mathematics 11. Students should make this decision following discussions with their family and school staff.

Students in Mathematics 10 will explore the following topics:

measurement systems, surface area and volume, right triangle trigonometry, exponents and radicals, polynomials, linear relations and functions, linear equations and graphs, solving systems of equations, and financial mathematics.

Mathematics at Work 10

(graduation credit type, 1 credit, 110-hour course)

Mathematics at Work 10 is a graduation credit type high school mathematics course.

It is recommended that students proceed to Mathematics at Work 11 upon completion of Mathematics at Work 10. In some cases students may choose a course other than Mathematics at Work 11. Students should make this decision following discussions with their family and school staff.

Students in Mathematics at Work 10 will explore the following topics:
measurement systems, surface area, Pythagorean theorem, right triangle trigonometry, similar polygons, angles, perpendicular and parallel lines, unit pricing, currency exchange, income, and basic algebra.

Mathematics Essentials 10

(graduation credit type, 1 credit, 110-hour course.)

Mathematics Essentials 10 is an introductory, graduation credit type high school mathematics course designed for students who do not intend to pursue post-secondary studies that require study in mathematics.

It is recommended that students proceed to Mathematics Essentials 11 upon completion of Mathematics Essentials 10. In some cases students may choose a course other than Mathematics Essentials 11. Students should make this decision following discussions with their family and school staff.

Students in Mathematics Essentials 10 will explore the following topics:
Mental math, working and earning, deductions and expenses, paying taxes, making purchases, buying decisions, probability, measuring and estimating, transformation and design, and buying a car.

Grade 11 Mathematics Course Descriptions

The following mathematics courses are available at the grade 11 level:

- Mathematics 11: 110 hours, 1 academic credit
- Extended Mathematics 11: 220 hours, 2 academic credits
- Pre-calculus 11: 110 hours, 1 advanced credit
- Mathematics at Work 11: 110 hours, 1 graduation credit
- Mathematics Essentials 11: 110 hours, 1 graduation credit

Mathematics 11

(academic, 1 credit, 110-hour course)

Mathematics 11 is an academic credit type high school mathematics course.

It is recommended that students have successfully completed Mathematics 10 prior to enrolling in this course.

Upon completion of Mathematics 11 it is recommended that students proceed to Mathematics 12 or Pre-calculus 11. In some cases students may choose a course other than Mathematics 12 or Pre-calculus 11. Students should make this decision following discussions with their family and school staff.

Students in Mathematics 11 will explore the following topics:
inductive and deductive reasoning, an introduction to proof, cosine law, sine law, statistics, systems of linear inequalities, and quadratic functions.

Extended Mathematics 11

(academic, 2 credits, 220-hour course.)

It is an academic credit type high school mathematics course. Extended Mathematics 11 is designed to allow students to complete the Mathematics 11 course over a full year.

Upon successful completion students will receive 2 academic credits; one grade 11 academic mathematics credit and one grade 11 technology credit.

It is recommended that students have successfully completed Mathematics 10 prior to enrolling in this course.

Upon completion of Extended Mathematics 11 it is recommended that students proceed to Mathematics 12. In some cases students may choose a course other than Mathematics 12. Students should make this decision following discussions with their family and school staff.

Students in Extended Mathematics 11 will explore the following topics:
 scale diagrams and factors, inductive and deductive reasoning, an introduction to proof, cosine law, sine law, spatial reasoning, statistics, systems of linear inequalities, and quadratic functions. Students will also analyze, interpret and draw conclusions from one and two variable data using numerical, graphical and algebraic summaries, and identify patterns, extract useful information and meaning from professionally collected data sets.

Pre-calculus 11

(advanced, 1 credit, 110-hour course)

Pre-calculus 11 is an advanced credit type high school mathematics course.

It is recommended that students have successfully completed Mathematics 11 prior to enrolling in this course.

Upon completion of Pre-calculus 11 it is recommended that students proceed to Mathematics 12 or Pre-calculus 12. In some cases students may choose a course other than Mathematics 12 or Pre-calculus 12. Students should make this decision following discussions with their family and school staff.

Students in Pre-calculus 11 will explore the following topics:
absolute value, radical expressions and equations, rational expressions and equations, angles in standard position, analyze and solve quadratic equations, linear and quadratic equations and inequalities in two variables, arithmetic and geometric sequences, and reciprocals of linear and quadratic functions, and the unit circle.

Mathematics at Work 11

(graduation credit type, 1 credit)

Mathematics at Work 11 is a graduation credit type high school mathematics course.

It is recommended that students have successfully completed Mathematics at Work 10 prior to enrolling in this course.

Upon completion of Mathematics at Work 11 it is recommended that students proceed to Mathematics at Work 12. In some cases students may choose a course other than Mathematics at Work 12. Students should make this decision following discussions with their family and school staff.

Students in Mathematics at Work 11 will explore the following topics:
measurement systems, surface area, volume, 2-D and 3-D geometry, scale, numerical reasoning, personal budgets, compound interest, financial institution services, data management, and formula manipulation for various contexts.

Mathematics Essentials 11

(graduation credit type, 1 credit, 110-hour course)

Mathematics Essentials 11 is a graduation credit type high school mathematics course designed for students who do not intend to pursue post-secondary studies that require study in mathematics .

It is recommended that students have successfully completed Mathematics Essentials 10 prior to enrolling in this course.

Upon completion of Mathematics Essentials 11 It is recommended that students proceed to Mathematics Essentials 12 . In some cases students may choose a course other than Mathematics Essentials 12. Students should make this decision following discussions with their family and school staff.

Students in Mathematics Essentials 11 will explore the following topics:
mental mathematics, data management, borrowing money, renting or buying, household budgets, investing money, measurement, 2-D and 3-D design, mathematics in content areas such as science and social studies.

Grade 12 Mathematics Course Descriptions

The following mathematics courses are available at the grade 12 level:

- Mathematics 12: 110 hours, 1 academic credit
- Pre-calculus 12: 110 hours, 1 advanced credit
- Calculus 12: 110 hours, 1 advanced credit
- Mathematics at Work 12: 110 hours, 1 graduation credit
- Mathematics Essentials 12: 110 hours, 1 graduation credit

Mathematics 12

(academic credit type, 1 credit, 110-hour course)

Mathematics 12 is an academic credit type high school mathematics course.

It is recommended that students have successfully completed Mathematics 11 or Extended Mathematics 11 prior to enrolling in this course.

Students in Mathematics 12 will explore the following topics:
borrowing money, investing money, set theory, logical reasoning, counting methods, probability, polynomial functions, exponential functions, logarithmic functions, and sinusoidal functions.

Pre-calculus 12

(advanced credit type, 1 credit, 110-hour course)

Pre-calculus 12 is an advanced credit type high school mathematics course.

It is recommended that students have successfully completed Pre-calculus 11 prior to enrolling in this course.

Upon completion of Pre-calculus 12 students may choose to enroll in Calculus 12.

Students in Pre-calculus 12 will explore the following topics:
transformations, radical functions, polynomial functions, trigonometry, exponential functions, logarithmic functions, rational functions, and function operations.

Calculus 12

(advanced, 1 credit, 110-hour course)

Calculus 12 is an advanced credit type high school mathematics course.

It is recommended that students have successfully completed Pre-calculus 12 prior to enrolling in this course.

Students in Calculus 12 will explore the following topics:
the concept of a limit, simple derivatives, properties of derivatives, derivatives of trigonometric, exponential and logarithmic functions, applications of derivatives - tangents, rates of change, motion, curve sketching, anti-derivatives, differential equations and applications of anti-derivatives.

Mathematics at Work 12

(graduation credit type, 1 credit, 110-hour course)

Mathematics at Work 12 is a graduation credit type level high school mathematics course.

It is recommended that students have successfully completed Mathematics at Work 11 prior to enrolling in this course.

Students in Mathematics at Work 12 will explore the following topics:
probability, measures of central tendency, scatterplots, linear relationships, owning and operating a vehicle, properties of polygons, transformations, trigonometry.

Mathematics Essentials 12

(graduation credit type, 1 credit, 110-hour course)

Mathematics Essentials 12 is a graduation credit type level high school mathematics course designed for students who do not intend to pursue post-secondary studies that require study in mathematics.

It is recommended that students have successfully completed Mathematics Essentials 11 prior to enrolling in this course.

Students in Mathematics Essentials 12 will explore the following topics:
measurement, ratio, rate, proportion, mathematics and career exploration, mathematics preparation for the workplace