



## Correlation of the Nova Scotia Mathematics Program of Study with Mathology Grade 9 (Number)

Curriculum Outcomes	Grade 9 Mathology.ca	Pearson Canada Grades 4–9 Mathematics Learning Progression
<p><b>Specific Outcomes</b> N01 Students will be expected to demonstrate an understanding of powers with integral bases (excluding base 0) and whole number exponents by</p> <ul style="list-style-type: none"> <li>• representing repeated multiplication, using powers</li> <li>• using patterns to show that a power with an exponent of zero is equal to one</li> <li>• solving problems involving powers.</li> </ul>	<p><b>Number Unit 3: Powers and Exponents</b> 6: Exploring Whole Number Exponents</p>	<p><b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b> <b>Investigating Number and Arithmetic Properties</b></p> <ul style="list-style-type: none"> <li>- Distinguishes between and investigates properties of prime and composite numbers (e.g., prime factorization).</li> <li>- Extends exponent notation to any repeated multiplication (e.g., <math>2 \times 2 \times 2 \times 2 = 2^4</math>) and evaluates expressions using exponents (e.g., <math>3^4 = 3 \times 3 \times 3 \times 3 = 81</math>).</li> </ul>
<p>N02 Students will be expected to demonstrate an understanding of operations on powers with integral bases (excluding base 0) and whole number exponents.</p> <ul style="list-style-type: none"> <li>• <math>(a^m)(a^n) = a^{m+n}</math></li> <li>• <math>a^m \div a^n = a^{m-n}, m &gt; n</math></li> <li>• <math>(a^m)^n = a^{mn}</math></li> <li>• <math>(ab)^m = a^m b^m</math></li> <li>• <math>\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}, b \neq 0</math></li> </ul>	<p><b>Number Unit 3: Powers and Exponents</b> 10: Exploring Exponent Laws</p>	<p><b>Big Idea Quantities and numbers can be operated on to determine how many and how much.</b> <b>Investigating Number and Arithmetic Properties</b></p> <ul style="list-style-type: none"> <li>- Distinguishes between and investigates properties of prime and composite numbers (e.g., prime factorization).</li> <li>- Extends exponent notation to any repeated multiplication (e.g., <math>2 \times 2 \times 2 \times 2 = 2^4</math>) and evaluates expressions using exponents (e.g., <math>3^4 = 3 \times 3 \times 3 \times 3 = 81</math>).</li> </ul>

<p>N03 Students will be expected to demonstrate an understanding of rational numbers by comparing and ordering rational numbers and solving problems that involve arithmetic operations on rational numbers.</p>	<p><b>Number Unit 4: Fluency with Rational Numbers</b>  11: Comparing and Ordering Rational Numbers  12: Operations with Positive and Negative Fractions and Decimals</p>	<p><b>Big Idea: The set of real numbers is infinite.</b>  <b>Extending Whole Number Understanding to the Set of Real Numbers</b></p> <ul style="list-style-type: none"> <li>- Extends decimal and fraction understanding to positive and negative rational numbers.</li> </ul> <p><b>Big Idea: Numbers are related in many ways.</b>  <b>Comparing and Ordering Quantities (Multitude and Magnitude)</b></p> <ul style="list-style-type: none"> <li>- Compares, orders, and locates positive and negative rational numbers.</li> </ul> <p><b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b>  <b>Developing Fluency of Operations</b></p> <ul style="list-style-type: none"> <li>- Uses reasoning, estimation, efficient strategies, and algorithms to operate on positive and negative rational numbers.</li> </ul>
<p>N04 Students will be expected to explain and apply the order of operations, including exponents, with and without technology.</p>	<p><b>Number Unit 4: Fluency with Rational Numbers</b>  13: Order of Operations with Rational Numbers</p>	<p><b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b>  <b>Investigating Number and Arithmetic Properties</b></p> <ul style="list-style-type: none"> <li>- Applies order of operations to equations involving exponents to evaluate expressions.</li> </ul>
<p>N05 Students will be expected to determine the exact square root of positive rational numbers.</p>	<p><b>Number Unit 2: Squares and Square Roots</b>  4: Calculating Square Roots of Perfect Squares</p>	<p><b>Big Idea: The set of real numbers is infinite.</b>  <b>Extending Whole Number Understanding to the Set of Real Numbers</b></p> <ul style="list-style-type: none"> <li>- Distinguishes between numbers that do and do not have whole number square roots.</li> </ul> <p><b>Big Idea: Quantities and numbers can be operated on to determine how many and how much.</b>  <b>Developing Conceptual Meaning of Operations</b></p> <ul style="list-style-type: none"> <li>- Models and demonstrates an understanding of squares and square roots.</li> </ul>
<p>N06 Students will be expected to determine an approximate square root of positive rational numbers.</p>	<p><b>Number Unit 2: Squares and Square Roots</b>  5: Estimating Square Roots of Non-Perfect Squares</p>	<p><b>Big Idea: The set of real numbers is infinite.</b>  <b>Extending Whole Number Understanding to the Set of Real Numbers</b></p> <ul style="list-style-type: none"> <li>- Distinguishes between numbers that do and do not have whole number square roots</li> </ul> <p><b>Big Idea: Numbers are related in many ways.</b>  <b>Estimating Quantities and Numbers</b></p> <ul style="list-style-type: none"> <li>- Estimates square roots of numbers that are imperfect squares (e.g., <math>\sqrt{28}</math> is between 5 and 6, and closer to 5).</li> </ul>



**Correlation of the Nova Scotia Mathematics Program of Study  
with Mathology Grade 9 (Patterns and Relations)**

Curriculum Outcomes	Grade 9 Mathology.ca	Pearson Canada Grades 4–9 Mathematics Learning Progression
<p><b>Specific Outcomes</b>            PR01 Students will be expected to generalize a pattern arising from a problem-solving context using a linear equation and verify by substitution.</p>	<p><b>Algebra Unit 2:            Linear Relations</b>            6: Investigating Linear Relations</p>	<p><b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b>  <b>Representing Patterns, Relations, and Functions</b></p> <ul style="list-style-type: none"> <li>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.</li> </ul> <p><b>Generalizing and Analyzing Patterns, Relations, and Functions</b></p> <ul style="list-style-type: none"> <li>- Predicts the value of a given element in a numeric or shape pattern using pattern rules.</li> </ul>
<p>PR02 Students will be expected to graph a linear relation, analyze the graph, and interpolate or extrapolate to solve problems.</p>	<p><b>Algebra Unit 2:            Linear Relations</b>            7: Graphing and Analyzing Linear Relations</p>	<p><b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b>  <b>Representing Patterns, Relations, and Functions</b></p> <ul style="list-style-type: none"> <li>- Models problems and solves linear relations with rational coefficients, variables, and constants in different forms.</li> </ul> <p><b>Generalizing and Analyzing Patterns, Relations, and Functions</b></p> <ul style="list-style-type: none"> <li>- Approximates linear relation values between and beyond data through interpolation and extrapolation.</li> </ul>



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<p><b>Specific Outcomes</b>            PR03 Students will be expected to model and solve problems, where a, b, c, d, e, and f are rational numbers, using linear equations of the form.</p> <ul style="list-style-type: none"> <li>• <math>ax = b</math></li> <li>• <math>\frac{x}{a} = b, a \neq 0</math></li> <li>• <math>ax + b = c</math></li> <li>• <math>\frac{x}{a} + b = c, a \neq 0</math></li> <li>• <math>ax = b + cx</math></li> <li>• <math>a(x + b) = c</math></li> <li>• <math>ax + b = cx + d</math></li> <li>• <math>a(bx + c) = d(ex + f)</math></li> <li>• <math>\frac{a}{x} = b, x \neq 0</math></li> </ul>	<p><b>Algebra Unit 5: Modelling and Solving Equations</b>            14: Modelling and Solving Linear Equations            15: Solving More Complex Linear Equations            16: Solving Linear Equations in Different Forms</p>	<p><b>Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.</b>  <b>Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations</b></p> <ul style="list-style-type: none"> <li>- Solves linear relations with rational coefficients, constants, and solutions (e.g., <math>2/3 m - 2 = -7/6</math>).</li> </ul>
<p>PR04 Students will be expected to explain and illustrate strategies to solve single variable linear inequalities with rational coefficients within a problem-solving context.</p>	<p><b>Algebra Unit 6: Inequalities</b>            17: Introducing Inequalities            18: Solving Linear Inequalities and Graphing Solutions</p>	<p><b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b>  <b>Representing Patterns, Relations, and Functions</b></p> <ul style="list-style-type: none"> <li>- Models and solves linear inequalities graphically and symbolically (<math>a + 5 &lt; 9</math>).</li> </ul>

<p>PR05 Students will be expected to demonstrate an understanding of polynomials (limited to polynomials of degree less than or equal to 2).</p>	<p><b>Algebra Unit 1: Algebraic Expressions</b> 1: Representing and Evaluating Polynomials</p>	<p><b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b> <b>Representing Patterns, Relations, and Functions</b></p> <ul style="list-style-type: none"> <li>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.</li> </ul> <p><b>Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.</b> <b>Using Variables, Algebraic Expressions, and Equations to Represent Mathematical Relations</b></p> <ul style="list-style-type: none"> <li>- Extends understanding of algebraic expressions to include writing and evaluating expressions with polynomials of degree two (e.g., <math>3x^2 - 7</math>).</li> </ul>
<p>PR06 Students will be expected to model, record, and explain the operations of addition and subtraction of polynomial expressions, concretely, pictorially, and symbolically (limited to polynomials of degree less than or equal to 2).</p>	<p><b>Algebra Unit 1: Algebraic Expressions</b> 3: Adding and Subtracting Polynomial Expressions</p>	<p><b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b> <b>Representing Patterns, Relations, and Functions</b></p> <ul style="list-style-type: none"> <li>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.</li> </ul> <p><b>Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.</b> <b>Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations</b></p> <ul style="list-style-type: none"> <li>- Applies arithmetic properties to operate on polynomial expressions and solve problems (e.g., find area of rectangle with sides of <math>3x</math> and <math>4 + x</math>). (Limited to degrees of 2.)</li> </ul>
<p>PR07 Students will be expected to model, record, and explain the operations of multiplication and division of polynomial expressions (limited to polynomials of degree less than or equal to 2) by monomials, concretely, pictorially, and symbolically.</p>	<p><b>Algebra Unit 1: Algebraic Expressions</b> 4: Multiplying and Dividing Polynomial Expressions</p>	<p><b>Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.</b> <b>Representing Patterns, Relations, and Functions</b></p> <ul style="list-style-type: none"> <li>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.</li> </ul> <p><b>Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.</b> <b>Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations</b></p> <ul style="list-style-type: none"> <li>- Applies arithmetic properties to operate on polynomial expressions and solve problems (e.g., find area of rectangle with sides of <math>3x</math> and <math>4 + x</math>). (Limited to degrees of 2.)</li> </ul>



**Correlation of the Nova Scotia Mathematics Program of Study  
with Mathology Grade 9 (Geometry)**

Curriculum Outcomes	Grade 9 Mathology.ca	Pearson Canada Grades 4–9 Mathematics Learning Progression
<p>G01 Students will be expected to determine the surface area of composite 3-D objects to solve problems</p>	<p><b>Geometry/ Measurement</b> <b>Unit 3: Measurement of 3-D Objects</b> 8: Investigating Surface Area of Composite 3-D Objects</p>	<p><b>Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.</b> <b>Understanding Relationships Among Measured Units</b></p> <ul style="list-style-type: none"> <li>- Determines volume and surface area of composite 3-D objects.</li> </ul> <p><b>Big Idea: Many things in our world (e.g., objects, spaces, events) have attributes that can be measured and compared.</b> <b>Understanding Attributes That Can Be Measured, Compared, and Ordered</b></p> <ul style="list-style-type: none"> <li>- Understands surface area as an attribute of 3-D objects that can be measured and compared.</li> </ul>



**Correlation of the Nova Scotia Mathematics Program of Study  
with Mathology Grade 9 (Statistics and Probability: Data Analysis)**

Curriculum Outcomes	Grade 9 Mathology.ca	Pearson Canada Grades 4–9 Mathematics Learning Progression
<p><b>Specific Outcomes</b> SP01 Students will be expected to describe the effect on the collection of data of bias, use of language, ethics, cost, time and timing, privacy, and cultural sensitivity.</p>	<p><b>Data Unit 1: Data Analysis</b> 1: Collecting Data 2: Factors Affecting Data Collection</p>	<p><b>Big Idea: Formulating questions, collecting data, and consolidating data in visual and graphical displays help us understand, predict, and interpret situations that involve uncertainty, variability, and randomness.</b></p> <p><b>Collecting Data and Organizing It into Categories</b></p> <ul style="list-style-type: none"> <li>- Explores methods for collecting data from a population (e.g., census) and a representative sample of a population.</li> <li>- Critiques methods for selecting representative samples from a population (e.g., bias, ethics, cost, privacy).</li> </ul> <p><b>Drawing Conclusions by Making Inferences and Justifying Decisions Based on Data Collected</b></p> <ul style="list-style-type: none"> <li>- Identifies and describes trends in data presented over time, and predicts future results.</li> </ul>

<p>SPO3 Students will be expected to develop and implement a project plan for the collection, display, and analysis of data by:</p> <ul style="list-style-type: none"> <li>• formulating a question for investigation</li> <li>• choosing a data collection method that includes social considerations</li> <li>• selecting a population or a sample</li> <li>• collecting the data</li> <li>• displaying the collected data in an appropriate manner</li> <li>• drawing conclusions to answer the question</li> </ul>	<p><b>Data Unit 1: Data Analysis</b> 3: Single-Variable Data Displays</p>	<p><b>Big Idea: Formulating questions, collecting data, and consolidating data in visual and graphical displays help us understand, predict, and interpret situations that involve uncertainty, variability, and randomness.</b></p> <p><b>Creating Graphical Displays of Collected Data</b></p> <ul style="list-style-type: none"> <li>- Visually represents large-scale data (e.g., histograms, box plots).</li> </ul>
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The following lessons are not required, but recommended:

- Mathology 9 Algebra Unit 1: Algebraic Expressions, Lesson 2: Coding: Exploring Algebraic Expressions
- Mathology 9 Algebra Unit 1: Algebraic Expressions, Lesson 5: Mathematical Modelling: Top Ten
- Mathology 9 Data Management Unit 1: Data Analysis, Lesson 6: Mathematical Modelling: Oil Reserves
- Mathology 9 Financial Literacy Unit 1: Making Financial Decisions