# Correlation of the Ontario Mathematics Curriculum with Mathology Grade 9

| **Overall Expectation**<br>**AA. Social-Emotional Learning (SEL) Skills in Mathematics** |
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| Mathology provides teachers with a flexible framework for Social Emotional Learning Skills, by including:<br>○ **Diverse resources** in real-world contexts, so students can see themselves and others while positively engaging in mathematical activities<br>○ **Differentiated support** to cope with challenges, meet students where they are and move them forward<br>○ **Learning opportunities** (small group, pair, whole class), to work collaboratively on math problems, share thinking, and listen to the thinking of others<br>○ **Digital** (e.g., virtual tools) and **printable resources** (e.g., lesson slides and line masters), which allow students to reveal their mathematical thinking in a risk-free environment<br>○ **A variety of voices** (built by and for Canadian learners) and opportunities to support **local contexts** (modifiable resources) |

| **A. Mathematical Thinking and Making Connections**<br>A1. Mathematical Processes: apply the mathematical processes to develop a conceptual understanding of, and procedural fluency with, the mathematics they are learning<br>A2. Making Connections: make connections between mathematics and various knowledge systems, their lived experiences, and various real-life applications of mathematics, including careers |
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| Mathology provides students with opportunities to apply the mathematical processes and to make connections, by including:<br>○ Opportunities for students to connect prior knowledge with new concepts and to connect new learning within and across strands<br>○ Rich, authentic, engaging, real-world problems that students can relate to and that have multiple entry points. These problems can be represented in different ways, and solved using different strategies, including the use of various manipulatives, materials, and technology<br>○ Opportunities for students to reflect on their work, thinking about the reasonableness of their solutions, and revising as needed to move their thinking forward.<br>○ Opportunities for students to justify and explain their thinking, to provide peer feedback, and to discuss their strategies with others (partners, small group, whole class)<br>○ Opportunities for students to see the applications of math outside of the classroom, including nature, different cultures, careers, and the Indigenous community. |

| Curriculum Expectations | Grade 9 Mathology.ca | Pearson Canada Grades 4–9 Mathematics Learning Progression |
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| **B. Number** | | |
| **B1. Development of Numbers and Number Sets**<br>demonstrate an understanding of the development and use of numbers, and make connections between sets of numbers | | |
| **Development and Use of Numbers** | | |
| B1.1 research a number concept to tell a story about its development and use in a specific culture, and describe its relevance in a current context | **Number Unit 1:**<br>**Numbers and Number Sets**<br>2: Density, Limits, and Infinity | **Big Idea: The set of real numbers is infinite.**<br>**Extending Whole Number Understanding to the Set of Real Numbers**<br>- Understands that there are infinitely many whole numbers and explores the concept of infinity.<br>**Big Idea: Numbers are related in many ways.**<br>**Comparing and Ordering Quantities (Multitude and Magnitude)**<br>- Compares, orders, and locates positive and negative rational numbers. |
| **Number Sets** | | |
| B1.2 describe how various subsets of a number system are defined, and describe similarities and differences between these subsets | **Number Unit 1:**<br>**Numbers and Number Sets**<br>1: Investigating and Labelling Number Systems | **Big Idea: Numbers are related in many ways.**<br>**Comparing and Ordering Quantities (Multitude and Magnitude)**<br>- Compares, orders, and locates positive and negative rational numbers.<br><br>**Big Idea: The set of real numbers is infinite.**<br>**Extending Whole Number Understanding to the Set of Real Numbers**<br>- Explores irrational numbers (e.g., √2 and π are numbers that cannot be expressed as ratios, but have unique locations on the number line). |
| B1.3 use patterns and number relationships to explain density, infinity, and limit as they relate to number sets | **Number Unit 1:**<br>**Numbers and Number Sets**<br>2: Density, Limits, and Infinity<br>3: Coding: Exploring Limits and Infinity | **Big Idea: The set of real numbers is infinite.**<br>**Extending Whole Number Understanding to the Set of Real Numbers**<br>- Understands that there are infinitely many whole numbers and explores the concept of infinity.<br><br>**Big Idea: Numbers are related in many ways.**<br>**Comparing and Ordering Quantities (Multitude and Magnitude)**<br>- Compares, orders, and locates positive and negative rational numbers. |

| **B2. Powers**<br>represent numbers in various ways, evaluate powers, and simplify expressions by using the relationships between powers and their exponents | | |
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| **Powers** | | |
| B2.1 analyse, through the use of patterning, the relationship between the sign and size of an exponent and the value of a power, and use this relationship to express numbers in scientific notation and evaluate powers | **Number Unit 3:**<br>**Powers and Exponents**<br>7: Exploring Negative Exponents<br>8: Representing Large Numbers Using Scientific Notation<br>9: Representing Small Numbers Using Scientific Notation | **Big Idea: Quantities and numbers can be operated on to determine how many and how much.**<br>**Investigating Number and Arithmetic Properties**<br>- Distinguishes between and investigates properties of prime and composite numbers (e.g., prime factorization).<br>- Extends exponent notation to any repeated multiplication (e.g., $2 \times 2 \times 2 \times 2 = 2^4$) and evaluates expressions using exponents (e.g., $3^4 = 3 \times 3 \times 3 \times 3 = 81$).<br>**Developing Fluency of Operations**<br>- Develops efficient strategies for computing numbers expressed in scientific notation.<br><br>**Big Idea: Quantities and numbers can be grouped by or partitioned into equal-sized units.**<br>**Unitizing Quantities into Base-Ten Units**<br>- Uses place value, rounding, and powers of 10 to represent very large and very small numbers using scientific notation (e.g., 3 241 782 can be represented as $3.24 \times 10^6$). |
| B2.2 analyse, through the use of patterning, the relationships between the exponents of powers and the operations with powers, and use these relationships to simplify numeric and algebraic expressions | **Number Unit 3:**<br>**Powers and Exponents**<br>10: Exploring Exponent Laws | **Big Idea: Quantities and numbers can be operated on to determine how many and how much.**<br>**Investigating Number and Arithmetic Properties**<br>- Distinguishes between and investigates properties of prime and composite numbers (e.g., prime factorization).<br>- Extends exponent notation to any repeated multiplication (e.g., $2 \times 2 \times 2 \times 2 = 2^4$) and evaluates expressions using exponents (e.g., $3^4 = 3 \times 3 \times 3 \times 3 = 81$). |

| **B3. Number Sense and Operations**<br>apply an understanding of rational numbers, ratios, rates, percentages, and proportions, in various mathematical contexts, and to solve problems | | |
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| **Rational Numbers** | | |
| B3.1 apply an understanding of integers to describe location, direction, amount, and changes in any of these, in various contexts | **Number Unit 4:**<br>**Fluency with Rational Numbers**<br>11: Comparing and Ordering Rational Numbers<br>12: Operations with Positive and Negative Fractions and Decimals | **Big Idea: The set of real numbers is infinite.**<br>**Extending Whole Number Understanding to the Set of Real Numbers**<br>- Extends decimal and fraction understanding to positive and negative rational numbers.<br><br>**Big Idea: Numbers are related in many ways.**<br>**Comparing and Ordering Quantities (Multitude and Magnitude)**<br>- Compares, orders, and locates positive and negative rational numbers.<br><br>**Big Idea: Quantities and numbers can be operated on to determine how many and how much.**<br>**Developing Fluency of Operations**<br>- Uses reasoning, estimation, efficient strategies, and algorithms to operate on positive and negative rational numbers. |
| B3.2 apply an understanding of unit fractions and their relationship to other fractional amounts, in various contexts, including the use of measuring tools | **Number Unit 4:**<br>**Fluency with Rational Numbers**<br>11: Comparing and Ordering Rational Numbers | **Big Idea: The set of real numbers is infinite.**<br>**Extending Whole Number Understanding to the Set of Real Numbers**<br>- Extends decimal and fraction understanding to positive and negative rational numbers.<br><br>**Big Idea: Numbers are related in many ways.**<br>**Comparing and Ordering Quantities (Multitude and Magnitude)**<br>- Compares, orders, and locates positive and negative rational numbers. |
| B3.3 apply an understanding of integers to explain the effects that positive and negative signs have on the values of ratios, rates, fractions, and decimals, in various contexts | **Number Unit 4:**<br>**Fluency with Rational Numbers**<br>12: Operations with Positive and Negative Fractions and Decimals | **Big Idea: Quantities and numbers can be operated on to determine how many and how much.**<br>**Developing Fluency of Operations**<br>- Uses reasoning, estimation, efficient strategies, and algorithms to operate on positive and negative rational numbers. |

| **Applications** | | |
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| B3.4 solve problems involving operations with positive and negative fractions and mixed numbers, including problems involving formulas, measurements, and linear relations, using technology when appropriate | **Number Unit 4:**<br>**Fluency with Rational Numbers**<br>12: Operations with Positive and Negative Fractions and Decimals<br><br>**Algebra Unit 5:**<br>**Modelling and Solving Equations**<br>15: Solving More Complex Linear Equations<br>16: Solving Linear Equations in Different Forms | **Big Idea: Quantities and numbers can be operated on to determine how many and how much.**<br>**Developing Fluency of Operations**<br>- Uses reasoning, estimation, efficient strategies, and algorithms to operate on positive and negative rational numbers.<br><br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations**<br>- Solves linear relations with rational coefficients, constants, and solutions (e.g., $2/3m - 2 = -7/6$). |
| B3.5 pose and solve problems involving rates, percentages, and proportions in various contexts, including contexts connected to real-life applications of data, measurement, geometry, linear relations, and financial literacy | **Number Unit 3:**<br>**Powers and Exponents**<br>8: Representing Large Numbers Using Scientific Notation<br>9: Representing Small Numbers Using Scientific Notation<br><br>**Algebra Unit 1: Algebraic Expressions**<br>5: Mathematical Modelling: Top 10<br><br>**Algebra Unit 2: Linear Relations**<br>8: Comparing Linear Relations<br><br>**Algebra Unit 4: Rates of Change, Slope, and *y*-Intercepts**<br>12: Connecting Rate of Change Situations with Slope and *y*-Intercepts | **Big Idea: Numbers are related in many ways.**<br>**Using Ratios, Rates, Proportions, and Percents Creates a Relationship Between Quantities**<br>- Solves for missing values and determines equivalent ratios and rates using flexible strategies (e.g., tables, graphing, unit rates, ab = cd relationship).<br>- Uses equations to represent proportional relationships and solve problems (e.g., using exchange rates to convert between currencies).<br>- Uses proportional reasoning in different contexts (e.g., scaling factors).<br>- Explores percentage increase and percentage decrease to solve problems (e.g., calculating simple and compound interest).<br><br>**Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.**<br>**Understanding Relationships Among Measured Units**<br>- Investigates the proportional effect of a scale factor on side lengths, perimeter, and area of similar (i.e., scalar) 2-D shapes. |

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| | **Geometry/Measurement Unit 2: Measurement of 2-D Shapes and Scale Drawings**<br>5: Drawing and Interpreting Scale Drawings<br>6: Exploring and Relating Measurement Systems<br><br>**Geometry/Measurement Unit 3: Measurement of 3-D Objects**<br>9: Investigating Volume of 3-D Objects<br>11: Exploring the Impact of Changing Dimensions on Measurements<br><br>**Data Unit 1: Data Analysis**<br>4: Two-Variable Data Displays<br>6: Mathematical Modelling: Oil Reserves<br><br>**Financial Literacy Unit 1: Making Financial Decisions**<br>1: Exploring Interest Rates and Loans<br>4: Exploring Appreciation and Depreciation | |

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| **C. Algebra** | | |
| **C1. Algebraic Expressions and Equations**<br>demonstrate an understanding of the development and use of algebraic concepts and of their connection to numbers, using various tools and representations | | |
| **Development and Use of Algebra** | | |
| C1.1 research an algebraic concept to tell a story about its development and use in a specific culture, and describe its relevance in a current context | **Algebra Unit 1:**<br>**Algebraic Expressions**<br>1: Representing and Evaluating Polynomials | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br><br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Using Variables, Algebraic Expressions, and Equations to Represent Mathematical Relations**<br>- Extends understanding of algebraic expressions to include writing and evaluating expressions with polynomials of degree two (e.g., $3x^2 - 7$). |
| **Algebraic Expressions and Equations** | | |
| C1.2 create algebraic expressions to generalize relationships expressed in words, numbers, and visual representations, in various contexts | **Algebra Unit 1:**<br>**Algebraic Expressions**<br>1: Representing and Evaluating Polynomials<br>2: Coding: Exploring Algebraic Expressions<br><br>**Algebra Unit 5:**<br>**Modelling and Solving Equations**<br>15: Solving More Complex Linear Equations<br>16: Solving Linear Equations in Different Forms | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br><br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Using Variables, Algebraic Expressions, and Equations to Represent Mathematical Relations**<br>- Extends understanding of algebraic expressions to include writing and evaluating expressions with polynomials of degree two (e.g., $3x^2 - 7$).<br>**Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations**<br>- Solves linear relations with rational coefficients, constants, and solutions (e.g., $2/3m - 2 = -7/6$). |

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| C1.3 compare algebraic expressions using concrete, numerical, graphical, and algebraic methods to identify those that are equivalent, and justify their choices | **Algebra Unit 1:**<br>**Algebraic Expressions**<br>1: Representing and Evaluating Polynomials<br>2: Coding: Exploring Algebraic Expressions | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br><br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Using Variables, Algebraic Expressions, and Equations to Represent Mathematical Relations**<br>- Extends understanding of algebraic expressions to include writing and evaluating expressions with polynomials of degree two (e.g., $3x^2 - 7$). |
| C1.4 simplify algebraic expressions by applying properties of operations of numbers, using various representations and tools, in different contexts | **Algebra Unit 1:**<br>**Algebraic Expressions**<br>3: Adding and Subtracting Polynomial Expressions<br>4: Multiplying and Dividing Polynomial Expressions | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br><br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations**<br>- Applies arithmetic properties to operate on polynomial expressions and solve problems (e.g., find area of rectangle with sides of $3x$ and $4 + x$). (Limited to degrees of 2.) |
| C1.5 create and solve equations for various contexts, and verify their solutions | **Algebra Unit 5:**<br>**Modelling and Solving Equations**<br>14: Modelling and Solving Linear Equations<br>15: Solving More Complex Linear Equations<br>16: Solving Linear Equations in Different Forms | **Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations**<br>- Solves linear relations with rational coefficients, constants, and solutions (e.g., $2/3m - 2 = -7/6$). |

| **C2. Coding**<br>apply coding skills to represent mathematical concepts and relationships dynamically, and to solve problems, in algebra and across the other strands | | |
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| **Coding** | | |
| C2.1 use coding to demonstrate an understanding of algebraic concepts including variables, parameters, equations, and inequalities | **Number Unit 1:**<br>**Numbers and Number Sets**<br>3: Coding: Exploring Limits and Infinity | **Big Idea: The set of real numbers is infinite.**<br>**Extending Whole Number Understanding to the Set of Real Numbers**<br>- Understands that there are infinitely many whole numbers and explores the concept of infinity. |
| | **Algebra Unit 1:**<br>**Algebraic Expressions**<br>2: Coding: Exploring Algebraic Expressions | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Using Variables, Algebraic Expressions, and Equations to Represent Mathematical Relations**<br>- Extends understanding of algebraic expressions to include writing and evaluating expressions with polynomials of degree two (e.g., $3x^2 - 7$). |
| | **Geometry/Measurement Unit 3:**<br>**Measurement of 3-D Objects**<br>10: Exploring Volume with Coding | **Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.**<br>**Understanding Relationships Among Measured Units**<br>- Develops and generalizes strategies and formulas to compute volume and surface area of regular solids (e.g., cones, cylinders, and spheres).<br>**Big Idea: Many things in our world (e.g., objects, spaces, events) have attributes that can be measured and compared.**<br>**Understanding Attributes That Can Be Measured, Compared, and Ordered**<br>- Understands volume and capacity as attributes of 3-D objects that can be measured and compared. |

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| | **Financial Literacy Unit 1:**<br>**Making Financial Decisions**<br>2: Calculating Interest with Coding<br>5: Creating and Modifying a Budget | **Big Idea: Numbers are related in many ways.**<br>**Using Ratios, Rates, Proportions, and Percents Creates a Relationship Between Quantities**<br>- Explores percentage increase and percentage decrease to solve problems (e.g., calculating simple and compound interest).<br>**Big Idea: Quantities and numbers can be operated on to determine how many and how much.**<br>**Developing Fluency of Operations**<br>- Solves whole number computation using efficient strategies (e.g., mental computation, algorithms, calculating cost of transactions and change owing, saving money to make a purchase). |
| C2.2 create code by decomposing situations into computational steps in order to represent mathematical concepts and relationships, and to solve problems | **Number Unit 1:**<br>**Numbers and Number Sets**<br>3: Coding: Exploring Limits and Infinity<br><br>**Algebra Unit 1:**<br>**Algebraic Expressions**<br>2: Coding: Exploring Algebraic Expressions<br><br>**Geometry/Measurement Unit 3:**<br>**Measurement of 3-D Objects**<br>10: Exploring Volume with Coding | **Big Idea: The set of real numbers is infinite.**<br>**Extending Whole Number Understanding to the Set of Real Numbers**<br>- Understands that there are infinitely many whole numbers and explores the concept of infinity.<br><br>**Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Using Variables, Algebraic Expressions, and Equations to Represent Mathematical Relations**<br>- Extends understanding of algebraic expressions to include writing and evaluating expressions with polynomials of degree two (e.g., $3x^2 - 7$).<br><br>**Big Idea: Many things in our world (e.g., objects, spaces, events) have attributes that can be measured and compared.**<br>**Understanding Attributes That Can Be Measured, Compared, and Ordered**<br>- Understands volume and capacity as attributes of 3-D objects that can be measured and compared. |

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| | | **Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.**<br>**Understanding Relationships Among Measured Units**<br>- Develops and generalizes strategies and formulas to compute volume and surface area of regular solids (e.g., cones, cylinders, and spheres). |
| | **Financial Literacy Unit 1: Making Financial Decisions**<br>2: Calculating Interest with Coding | **Big Idea: Numbers are related in many ways.**<br>**Using Ratios, Rates, Proportions, and Percents Creates a Relationship Between Quantities**<br>- Explores percentage increase and percentage decrease to solve problems (e.g., calculating simple and compound interest). |
| C2.3 read code to predict its outcome, and alter code to adjust constraints, parameters, and outcomes to represent a similar or new mathematical situation | **Number Unit 1: Numbers and Number Sets**<br>3: Coding: Exploring Limits and Infinity | **Big Idea: The set of real numbers is infinite.**<br>**Extending Whole Number Understanding to the Set of Real Numbers**<br>- Understands that there are infinitely many whole numbers and explores the concept of infinity. |
| | **Algebra Unit 1: Algebraic Expressions**<br>2: Coding: Exploring Algebraic Expressions | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Using Variables, Algebraic Expressions, and Equations to Represent Mathematical Relations**<br>- Extends understanding of algebraic expressions to include writing and evaluating expressions with polynomials of degree two (e.g., $3x^2 - 7$). |
| | **Geometry/Measurement Unit 3: Measurement of 3-D Objects**<br>10: Exploring Volume with Coding | **Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.**<br>**Understanding Relationships Among Measured Units**<br>- Develops and generalizes strategies and formulas to compute volume and surface area of regular solids (e.g., cones, cylinders, and spheres). |

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| | | **Big Idea: Many things in our world (e.g., objects, spaces, events) have attributes that can be measured and compared.**<br>**Understanding Attributes That Can Be Measured, Compared, and Ordered**<br>- Understands volume and capacity as attributes of 3-D objects that can be measured and compared. |
| | **Financial Literacy Unit 1: Making Financial Decisions**<br>2: Calculating Interest with Coding | **Using Ratios, Rates, Proportions, and Percents Creates a Relationship Between Quantities**<br>- Explores percentage increase and percentage decrease to solve problems (e.g., calculating simple and compound interest). |
| **C3. Application of Relations**<br>represent and compare linear and non-linear relations that model real-life situations, and use these representations to make predictions | | |
| **Application of Linear and Non-Linear Relations** | | |
| C3.1 compare the shapes of graphs of linear and non-linear relations to describe their rates of change, to make connections to growing and shrinking patterns, and to make predictions | **Algebra Unit 2: Linear Relations**<br>7: Graphing and Analyzing Linear Relations<br>8: Comparing Linear Relations | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Models problems and solves linear relations with rational coefficients, variables, and constants in different forms.<br>**Generalizing and Analyzing Patterns, Relations, and Functions**<br>- Approximates linear relation values between and beyond data through interpolation and extrapolation. |
| | **Algebra Unit 3: Non-Linear Relations**<br>9: Investigating Non-Linear Relations<br>10: Graphing and Analyzing Non-Linear Relations | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Generalizing and Analyzing Patterns, Relations, and Functions**<br>- Compares linear relations on the same graph and describes the differences graphically (e.g., *y*-intercept) and symbolically (e.g., constant).<br>**Representing Patterns, Relations, and Functions**<br>- Differentiates between linear and non-linear relations by their graphical representation. |

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| C3.2 represent linear relations using concrete materials, tables of values, graphs, and equations, and make connections between the various representations to demonstrate an understanding of rates of change and initial values | **Algebra Unit 2: Linear Relations**<br>6: Investigating Linear Relations<br>7: Graphing and Analyzing Linear Relations<br><br>**Algebra Unit 3: Non-Linear Relations**<br>9: Investigating Non-Linear Relations<br>10: Graphing and Analyzing Non-Linear Relations | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br>**Generalizing and Analyzing Patterns, Relations, and Functions**<br>- Predicts the value of a given element in a numeric or shape pattern using pattern rules.<br><br>**Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Models problems and solves linear relations with rational coefficients, variables, and constants in different forms.<br>- Differentiates between linear and non-linear relations by their graphical representation.<br>**Generalizing and Analyzing Patterns, Relations, and Functions**<br>- Approximates linear relation values between and beyond data through interpolation and extrapolation. |
| C3.3 compare two linear relations of the form y = ax + b graphically and algebraically, and interpret the meaning of their point of intersection in terms of a given context | **Algebra Unit 2: Linear Relations**<br>8: Comparing Linear Relations | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Generalizing and Analyzing Patterns, Relations, and Functions**<br>- Compares linear relations on the same graph and describes the differences graphically (e.g., *y*-intercept) and symbolically (e.g., constant). |
| **C4. Characteristics of Relations**<br>demonstrate an understanding of the characteristics of various representations of linear and non-linear relations, using tools, including coding when appropriate | | |
| **Characteristics of Linear and Non-Linear Relations** | | |
| C4.1 compare characteristics of graphs, tables of values, and equations of linear and non-linear relations | **Algebra Unit 2: Linear Relations**<br>8: Comparing Linear Relations | **Big idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Generalizing and Analyzing Patterns, Relations, and Functions**<br>- Compares linear relations on the same graph and describes the differences graphically (e.g., *y*-intercept) and symbolically (e.g., constant). |

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| | **Algebra Unit 3:**<br>**Non-Linear Relations**<br>9: Investigating Non-Linear Relations<br>10: Graphing and Analyzing Non-Linear Relations | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Differentiates between linear and non-linear relations by their graphical representation. |
| C4.2 graph relations represented as algebraic equations of the forms x = k, y = k, x + y = k, x – y = k, ax + by = k, and xy = k, and their associated inequalities, where a, b, and k are constants, to identify various characteristics and the points and/or regions defined by these equations and inequalities | **Algebra Unit 3:**<br>**Non-Linear Relations**<br>11: Graphing Relations in Different Forms<br><br>**Algebra Unit 6: Inequalities**<br>19: Graphing Two-Variable Inequalities | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Differentiates between linear and non-linear relations by their graphical representation.<br><br>**Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Models and solves linear inequalities graphically and symbolically ($a + 5 < 9$). |
| C4.3 translate, reflect, and rotate lines defined by y = ax, where a is a constant, and describe how each transformation affects the graphs and equations of the defined lines | **Algebra Unit 4: Rates of Change, Slope, and *y*-Intercepts**<br>13: Investigating Families of Lines | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Models linear functions with the equation $y = mx + b$ and relates the equation to a graph. |
| C4.4 determine the equations of lines from graphs, tables of values, and concrete representations of linear relations by making connections between rates of change and slopes, and between initial values and y-intercepts, and use these equations to solve problems | **Algebra Unit 4: Rates of Change, Slope, and *y*-Intercepts**<br>12: Connecting Rate of Change Situations with Slope and *y*-Intercepts | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Models linear functions with the equation $y = mx + b$ and relates the equation to a graph. |

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| **D. Data** | | |
| **D1. Collection, Representation, and Analysis of Data**<br>describe the collection and use of data, and represent and analyse data involving one and two variables | | |
| **Application of Data** | | |
| D1.1 identify a current context involving a large amount of data, and describe potential implications and consequences of its collection, storage, representation, and use | **Data Unit 1: Data Analysis**<br>1: Collecting Data<br>2: Factors Affecting Data Collection<br>3: Single-Variable Data Displays | **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.**<br>**Collecting Data and Organizing It into Categories**<br>- Explores methods for collecting data from a population (e.g., census) and a representative sample of a population.<br>- Critiques methods for selecting representative samples from a population (e.g., bias, ethics, cost, privacy).<br>**Creating Graphical Displays of Collected Data**<br>- Visually represents large-scale data (e.g., histograms, box plots). |
| **Representation and Analysis of Data** | | |
| D1.2 represent and statistically analyse data from a real-life situation involving a single variable in various ways, including the use of quartile values and box plots | **Data Unit 1: Data Analysis**<br>3: Single-Variable Data Displays | **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.**<br>**Creating Graphical Displays of Collected Data**<br>- Visually represents large-scale data (e.g., histograms, box plots). |
| D1.3 create a scatter plot to represent the relationship between two variables, determine the correlation between these variables by testing different regression models using technology, and use a model to make predictions when appropriate | **Data Unit 1: Data Analysis**<br>4: Two-Variable Data Displays | **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.**<br>**Creating Graphical Displays of Collected Data**<br>- Visually represents bivariate data to reveal relationships (e.g., scatter plots; line of best fit; two-way tables).<br>**Drawing Conclusions by Making Inferences and Justifying Decisions Based on Data Collected**<br>- Identifies and describes trends in data presented over time, and predicts future results. |

| **D2. Mathematical Modelling**<br>apply the process of mathematical modelling, using data and mathematical concepts from other strands, to represent, analyse, make predictions, and provide insight into real-life situations | | |
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| **Application of Mathematical Modelling** | | |
| D2.1 describe the value of mathematical modelling and how it is used in real life to inform decisions | **Data Unit 1: Data Analysis**<br>4: Two-Variable Data Displays<br>6: Mathematical Modelling: Oil Reserves | **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.**<br>**Creating Graphical Displays of Collected Data**<br>- Visually represents bivariate data to reveal relationships (e.g., scatter plots; line of best fit; two-way tables).<br>**Drawing Conclusions by Making Inferences and Justifying Decisions Based on Data Collected**<br>- Identifies and describes trends in data presented over time, and predicts future results. |
| | **Algebra Unit 1: Algebraic Expressions**<br>5: Mathematical Modelling: Top 10 | **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.**<br>**Formulating Questions to Learn About Groups, Collections, and Events by Collecting Relevant Data**<br>- Generates questions seeking a potential relationship between two variables or attributes (e.g., Does study time impact test scores?).<br>**Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations**<br>- Applies arithmetic properties to operate on polynomial expressions and solve problems (e.g., find area of rectangle with sides of $3x$ and $4 + x$). (Limited to degrees of 2.) |

| Process of Mathematical Modelling | | |
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| D2.2 identify a question of interest requiring the collection and analysis of data, and identify the information needed to answer the question | **Algebra Unit 1: Algebraic Expressions**<br>5: Mathematical Modelling: Top Ten<br><br>**Data Unit 1: Data Analysis**<br>6: Mathematical Modelling: Oil Reserves | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations**<br>- Applies arithmetic properties to operate on polynomial expressions and solve problems (e.g., find area of rectangle with sides of 3*x* and 4 + *x*). (Limited to degrees of 2.)<br><br>**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.**<br>**Formulating Questions to Learn About Groups, Collections, and Events by Collecting Relevant Data**<br>- Generates questions seeking a potential relationship between two variables or attributes (e.g., Does study time impact test scores?). |
| D2.3 create a plan to collect the necessary data on the question of interest from an appropriate source, identify assumptions, identify what may vary and what may remain the same in the situation, and then carry out the plan | **Data Unit 1: Data Analysis**<br>3: Single-Variable Data Displays<br>4: Two-Variable Data Displays<br>6: Mathematical Modelling: Oil Reserves | **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.**<br>**Creating Graphical Displays of Collected Data**<br>- Visually represents large-scale data (e.g., histograms, box plots).<br>- Visually represents bivariate data to reveal relationships (e.g., scatter plots; line of best fit; two-way tables).<br>**Drawing Conclusions by Making Inferences and Justifying Decisions Based on Data Collected**<br>- Identifies and describes trends in data presented over time, and predicts future results.<br>**Formulating Questions to Learn About Groups, Collections, and Events by Collecting Relevant Data**<br>- Generates questions seeking a potential relationship between two variables or attributes (e.g., Does study time impact test scores?). |

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| | **Algebra Unit 1: Algebraic Expressions**<br>5: Mathematical Modelling: Top Ten | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations**<br>- Applies arithmetic properties to operate on polynomial expressions and solve problems (e.g., find area of rectangle with sides of 3*x* and 4 + *x*). (Limited to degrees of 2.) |
| D2.4 determine ways to display and analyse the data in order to create a mathematical model to answer the original question of interest, taking into account the nature of the data, the context, and the assumptions made | **Data Unit 1: Data Analysis**<br>3: Single-Variable Data Displays<br>6: Mathematical Modelling: Oil Reserves | **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.**<br>**Creating Graphical Displays of Collected Data**<br>- Visually represents large-scale data (e.g., histograms, box plots).<br>**Formulating Questions to Learn About Groups, Collections, and Events by Collecting Relevant Data**<br>- Generates questions seeking a potential relationship between two variables or attributes (e.g., Does study time impact test scores?). |
| | **Algebra Unit 1: Algebraic Expressions**<br>5: Mathematical Modelling: Top Ten | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations**<br>- Applies arithmetic properties to operate on polynomial expressions and solve problems (e.g., find area of rectangle with sides of 3*x* and 4 + *x*). (Limited to degrees of 2.) |

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| D2.5 report how the model can be used to answer the question of interest, how well the model fits the context, potential limitations of the model, and what predictions can be made based on the model | **Data Unit 1: Data Analysis**<br>3: Single-Variable Data Displays<br>6: Mathematical Modelling: Oil Reserves<br><br>**Algebra Unit 1: Algebraic Expressions**<br>5: Mathematical Modelling: Top Ten | **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.**<br>**Creating Graphical Displays of Collected Data**<br>- Visually represents large-scale data (e.g., histograms, box plots).<br>**Formulating Questions to Learn About Groups, Collections, and Events by Collecting Relevant Data**<br>- Generates questions seeking a potential relationship between two variables or attributes (e.g., Does study time impact test scores?).<br><br>**Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Represents a mathematical context or problem with expressions and equations using variables to represent unknowns.<br>**Big Idea: Patterns and relations can be represented with symbols, equations, and expressions.**<br>**Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations**<br>- Applies arithmetic properties to operate on polynomial expressions and solve problems (e.g., find area of rectangle with sides of 3$x$ and 4 + $x$). (Limited to degrees of 2.) |

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| **E. Geometry and Measurement** | | |
| **E1. Geometric and Measurement Relationships**<br>demonstrate an understanding of the development and use of geometric and measurement relationships, and apply these relationships to solve problems, including problems involving real-life situations | | |
| **Geometric and Measurement Relationships** | | |
| E1.1 research a geometric concept or a measurement system to tell a story about its development and use in a specific culture or community, and describe its relevance in connection to careers and to other disciplines | **Geometry/Measurement Unit 1: Geometry Around Us**<br>1: Investigating Geometric Attributes including Line and Rotational Symmetry<br><br>**Geometry/Measurement Unit 2: Measurement of 2-D Shapes and Scale Drawings**<br>6: Exploring and Relating Measurement Systems | **Big Idea: 2-D shapes and 3-D solids can be transformed in many ways and analyzed for change.**<br>**Exploring Symmetry to Analyze 2-D Shapes and 3-D Solids**<br>- Draws, creates, and identifies shapes that have rotational symmetry, and identifies the centre of rotation and angle of rotation.<br>**Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.**<br>**Understanding Relationships Among Measured Units**<br>- Understands and applies the multiplicative relationship among metric units of length, mass, and capacity. |
| E1.2 create and analyse designs involving geometric relationships and circle and triangle properties, using various tools | **Geometry/Measurement Unit 1: Geometry Around Us**<br>1: Investigating Geometric Attributes including Line and Rotational Symmetry<br>2: Investigating Circle Properties and Constructions<br>3: Geometric Relationships and Designs | **Big Idea: 2-D shapes and 3-D solids can be transformed in many ways and analyzed for change.**<br>**Exploring Symmetry to Analyze 2-D Shapes and 3-D Solids**<br>- Draws, creates, and identifies shapes that have rotational symmetry, and identifies the centre of rotation and angle of rotation.<br>**Investigating Geometric Attributes and Properties of 2-D Shapes and 3-D Solids**<br>- Extends understanding of circle attributes to include arcs, sectors, chords, tangents, etc.<br>- Performs geometric constructions to gain insight into properties of lines, angles, and polygons (e.g., constructs perpendicular bisectors, 45° angles, angle bisectors, equilateral triangle).<br><br>**Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.**<br>**Understanding Relationships Among Measured Units**<br>- Uses circle properties to generalize and solve problems (e.g., central angle, inscribed angle, tangent-radius, triangle applications, chord bisector).<br>- Investigates and generalizes the sum of interior angles of polygons (e.g., subdivide a hexagon into triangles). |

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| E1.3 solve problems involving different units within a measurement system and between measurement systems, including those from various cultures or communities, using various representations and technology, when appropriate | **Geometry/Measurement Unit 2: Measurement of 2-D Shapes and Scale Drawings**<br>5: Drawing and Interpreting Scale Drawings<br>6: Exploring and Relating Measurement Systems<br>7: Solving Right-Triangle Problems | **Big Idea: 2-D shapes and 3-D solids can be analyzed and classified in different ways by their attributes.**<br>**Investigating Geometric Attributes and Properties of 2-D Shapes and 3-D Solids**<br>- Uses interior angle properties of polygons to solve problems and determine similarity.<br>**Exploring 2-D Shapes and 3-D Solids by Applying and Visualizing Transformations**<br>- Investigates dilation as a form of transformation and creates scale drawings using scale factors.<br><br>**Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.**<br>**Understanding Relationships Among Measured Units**<br>- Understands and applies the multiplicative relationship among metric units of length, mass, and capacity.<br>- Develops and generalizes strategies to construct, compute, and apply the Pythagorean Theorem.<br>**Selecting and Using Units to Estimate, Measure, Construct, and Make Comparisons**<br>- Applies Pythagorean Theorem to find unknown side lengths and distance between points on a Cartesian plane. |
| E1.4 show how changing one or more dimensions of a two-dimensional shape and a three-dimensional object affects perimeter/circumference, area, surface area, and volume, using technology when appropriate | **Geometry/Measurement Unit 3: Measurement of 3-D Objects**<br>10: Exploring Volume with Coding<br>11: Exploring the Impact of Changing Dimensions on Measurements | **Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.**<br>**Understanding Relationships Among Measured Units**<br>- Develops and generalizes strategies and formulas to compute volume and surface area of regular solids (e.g., cones, cylinders, and spheres).<br>- Investigates the proportional effect of a scale factor on side lengths, perimeter, and area of similar (i.e., scalar) 2-D shapes.<br>**Big Idea: Many things in our world (e.g., objects, spaces, events) have attributes that can be measured and compared.**<br>**Understanding Attributes That Can Be Measured, Compared, and Ordered**<br>- Understands volume and capacity as attributes of 3-D objects that can be measured and compared. |

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| E1.5 solve problems involving the side-length relationship for right triangles in real-life situations, including problems that involve composite shapes | **Geometry/Measurement Unit 2: Measurement of 2-D Shapes and Scale Drawings**<br>7: Solving Right-Triangle Problems | **Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.**<br>**Understanding Relationships Among Measured Units**<br>- Develops and generalizes strategies to construct, compute, and apply the Pythagorean Theorem.<br>**Selecting and Using Units to Estimate, Measure, Construct, and Make Comparisons**<br>- Applies Pythagorean Theorem to find unknown side lengths and distance between points on a Cartesian plane. |
| E1.6 solve problems using the relationships between the volume of prisms and pyramids and between the volume of cylinders and cones, involving various units of measure | **Geometry/Measurement Unit 3: Measurement of 3-D Objects**<br>9: Investigating Volume of 3-D Objects<br>10: Exploring Volume with Coding | **Big Idea: Assigning a unit to a continuous attribute allows us to measure and make comparisons.**<br>**Understanding Relationships Among Measured Units**<br>- Develops and generalizes strategies and formulas to compute volume and surface area of regular solids (e.g., cones, cylinders, and spheres).<br><br>**Big Idea: Many things in our world (e.g., objects, spaces, events) have attributes that can be measured and compared.**<br>**Understanding Attributes That Can Be Measured, Compared, and Ordered**<br>- Understands volume and capacity as attributes of 3-D objects that can be measured and compared. |

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| **F. Financial Literacy** | | |
| **F1. Financial Decisions**<br>demonstrate the knowledge and skills needed to make informed financial decisions | | |
| **Financial Decisions** | | |
| F1.1 identify a past or current financial situation and explain how it can inform financial decisions, by applying an understanding of the context of the situation and related mathematical knowledge | **Financial Literacy Unit 1: Making Financial Decisions**<br>4: Exploring Appreciation and Depreciation<br>5: Creating and Modifying a Budget | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Differentiates between linear and non-linear relations by their graphical representation.<br><br>**Big Idea: Quantities and numbers can be operated on to determine how many and how much.**<br>**Developing Fluency of Operations**<br>- Solves whole number computation using efficient strategies (e.g., mental computation, algorithms, calculating cost of transactions and change owing, saving money to make a purchase). |
| F1.2 identify financial situations that involve appreciation and depreciation, and use associated graphs to answer related questions | **Financial Literacy Unit 1: Making Financial Decisions**<br>4: Exploring Appreciation and Depreciation | **Big Idea: Regularity and repetition form patterns that can be generalized and predicted mathematically.**<br>**Representing Patterns, Relations, and Functions**<br>- Differentiates between linear and non-linear relations by their graphical representation. |
| F1.3 compare the effects that different interest rates, lengths of borrowing time, ways in which interest is calculated, and amounts of down payments have on the overall costs associated with purchasing goods or services, using appropriate tools | **Financial Literacy Unit 1: Making Financial Decisions**<br>1: Exploring Interest Rates and Loans<br>2: Calculating Interest with Coding | **Big Idea: Numbers are related in many ways.**<br>**Using Ratios, Rates, Proportions, and Percents Creates a Relationship Between Quantities**<br>- Explores percentage increase and percentage decrease to solve problems (e.g., calculating simple and compound interest). |
| F1.4 modify budgets displayed in various ways to reflect specific changes in circumstances, and provide a rationale for the modifications | **Financial Literacy Unit 1: Making Financial Decisions**<br>1: Exploring Interest Rates and Loans<br>5: Creating and Modifying a Budget | **Big Idea: Numbers are related in many ways.**<br>**Using Ratios, Rates, Proportions, and Percents Creates a Relationship Between Quantities**<br>- Explores percentage increase and percentage decrease to solve problems (e.g., calculating simple and compound interest). |

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| | | **Big Idea: Quantities and numbers can be operated on to determine how many and how much.**<br>**Developing Fluency of Operations**<br>- Solves whole number computation using efficient strategies (e.g., mental computation, algorithms, calculating cost of transactions and change owing, saving money to make a purchase). |