

Mathematics Grades 7–8–9 Alignment Chart

OVERALL AND SPECIFIC EXPECTATIONS

Below is a chart cross-referencing the 2021 Grade 9 Mathematics course with related learning in Grades 7 and 8.

GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND A: Social-Emotional Learning (SEL) Skills in Mathematics and the Mathematical Processes	STRAND A: Social-Emotional Learning (SEL) Skills in Mathematics and the Mathematical Processes	STRAND AA: Social-Emotional Learning (SEL) Skills in Mathematics
Throughout this grade, in order to promote a positive identity as a math learner, to foster well-being and the ability to learn, build resilience, and thrive, students will:	Throughout this grade, in order to promote a positive identity as a math learner, to foster well-being and the ability to learn, build resilience, and thrive, students will:	Throughout this course, in the context of learning related to the other strands, students will:
A1. apply, to the best of their ability, a variety of social-emotional learning skills to support their use of the mathematical processes and their learning in connection with the expectations in the other five strands of the mathematics curriculum	A1. apply, to the best of their ability, a variety of social-emotional learning skills to support their use of the mathematical processes and their learning in connection with the expectations in the other five strands of the mathematics curriculum	AA1. develop and explore a variety of social-emotional learning skills in a context that supports and reflects this learning in connection with the expectations across all other strands* * This overall expectation is to be included in classroom instruction, but not in assessment, evaluation, or reporting.

GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND A: Social-Emotional Learning (SEL) Skills in Mathematics and the Mathematical Processes	STRAND A: Social-Emotional Learning (SEL) Skills in Mathematics and the Mathematical Processes	STRAND A: Mathematical Thinking and Making Connections
Throughout this grade, in order to promote a positive identity as a math learner, to foster well-being and the ability to learn, build resilience, and thrive, students will:	Throughout this grade, in order to promote a positive identity as a math learner, to foster well-being and the ability to learn, build resilience, and thrive, students will:	Throughout this course, in connection with the learning in the other strands, students will:
A1. apply, to the best of their ability, a variety of social-emotional learning skills to support their use of the mathematical processes and their learning in connection with the expectations in the other five strands of the mathematics curriculum	A1. apply, to the best of their ability, a variety of social-emotional learning skills to support their use of the mathematical processes and their learning in connection with the expectations in the other five strands of the mathematics curriculum	A1. apply the mathematical processes to develop a conceptual understanding of, and procedural fluency with, the mathematics they are learning
		A2. make connections between mathematics and various knowledge systems, their lived experiences, and various real-life applications of mathematics, including careers

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GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND B: Number By the end of this grade, students will:	STRAND B: Number By the end of this grade, students will:	STRAND B: Number By the end of this course, students will:
B1. demonstrate an understanding of numbers and make connections to the way numbers are used in everyday life	B1. demonstrate an understanding of numbers and make connections to the way numbers are used in everyday life	B1. demonstrate an understanding of the development and use of numbers, and make connections between sets 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
B1.3 read, represent, compare, and order rational numbers, including positive and negative fractions and decimal numbers to thousandths, in various contexts	B1.2 describe, compare, and order numbers in the real number system (rational and irrational numbers), separately and in combination, in various contexts	B1.2 describe how various subsets of a number system are defined, and describe similarities and differences between these subsets
B1.5 generate fractions and decimal numbers between any two quantities		B1.3 use patterns and number relationships to explain density, infinity, and limit as they relate to number sets
		B2. represent numbers in various ways, evaluate powers, and simplify expressions by using the relationships between powers and their exponents
B1.1 represent and compare whole numbers up to and including one billion, including in expanded form using powers of ten, and describe various ways they are used in everyday life B1.2 identify and represent perfect squares, and determine their square roots, in various contexts B2.7 evaluate and express repeated multiplication of whole numbers using exponential notation, in various contexts	B1.1 represent and compare very large and very small numbers, including through the use of scientific notation, and describe various ways they are used in everyday life B2.2 understand and recall commonly used square numbers and their square roots	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
		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
B2. use knowledge of numbers and operations to solve mathematical problems encountered in everyday life	B2. use knowledge of numbers and operations to solve mathematical problems encountered in everyday life	B3. apply an understanding of rational numbers, ratios, rates, percentages, and proportions, in various mathematical contexts, and to solve problems
C1.4 create and describe patterns to illustrate relationships among integers B2.4 use objects, diagrams, and equations to represent, describe, and solve situations involving addition and subtraction of integers	B2.4 add and subtract integers, using appropriate strategies, in various contexts B2.7 multiply and divide integers, using appropriate strategies, in various contexts	B3.1 apply an understanding of integers to describe location, direction, amount, and changes in any of these, in various contexts

GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND B: Number By the end of this grade, students will:	STRAND B: Number By the end of this grade, students will:	STRAND B: Number By the end of this course, students will:
B1.4 use equivalent fractions to simplify fractions, when appropriate, in various contexts		B3.2 apply an understanding of unit fractions and their relationship to other fractional amounts, in various contexts, including the use of measuring tools
B1.7 convert between fractions, decimal numbers, and percents, in various contexts B1.6 round decimal numbers to the nearest tenth, hundredth, or whole number, as applicable, in various contexts B2.2 understand and recall commonly used percents, fractions, and decimal equivalents	C1.4 create and describe patterns to illustrate relationships among rational numbers B1.4 use fractions, decimal numbers, and percents, including percents of more than 100% or less than 1%, interchangeably and flexibly to solve a variety of problems	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
by creating equivalent fractions, including by creating equivalent fractions, in various contexts B2.6 determine the greatest common factor for a variety of whole numbers up to 144 and the lowest common multiple for two and three whole numbers B2.8 multiply and divide fractions by fractions, using tools in various contexts	B2.5 add and subtract fractions, using appropriate strategies, in various contexts B2.6 multiply and divide fractions by fractions, as well as by whole numbers and mixed numbers, in various contexts	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
B2.1 use the properties and order of operations, and the relationships between operations, to solve problems involving whole numbers, decimal numbers, fractions, ratios, rates, and percents, including those requiring multiple steps or multiple operations B2.10 identify proportional and non-proportional situations and apply proportional reasoning to solve problems	B2.1 use the properties and order of operations, and the relationships between operations, to solve problems involving rational numbers, ratios, rates, and percents, including those requiring multiple steps or multiple operations B2.8 compare proportional situations and determine unknown values in proportional situations, and apply proportional reasoning to solve problems in various contexts	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
B2.3 use mental math strategies to increase and decrease a whole number by 1%, 5%, 10%, 25%, 50%, and 100%, and explain the strategies used	B2.3 use mental math strategies to multiply and divide whole numbers and decimal numbers up to thousandths by powers of ten, and explain the strategies used	
B2.9 multiply and divide decimal numbers by decimal numbers, in various contexts D2.1 describe the difference between independent and dependent events, and explain how their probabilities differ, providing examples D2.2 determine and compare the theoretical and experimental probabilities of two independent events happening and of two dependent events happening	D2.1 solve various problems that involve probability, using appropriate tools and strategies, including Venn and tree diagrams D2.2 determine and compare the theoretical and experimental probabilities of multiple independent events happening and of multiple dependent events happening	
F1.1 identify and compare exchange rates, and convert foreign currencies to Canadian dollars and vice versa		

GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND C: Algebra By the end of this grade, students will:	STRAND C: Algebra By the end of this grade, students will:	STRAND C: Algebra By the end of this course, students will:
C2. demonstrate an understanding of variables, expressions, equalities, and inequalities, and apply this understanding in various contexts	C2. demonstrate an understanding of variables, expressions, equalities, and inequalities, and apply this understanding in various contexts	C1. demonstrate an understanding of the development and use of algebraic concepts and of their connection to numbers, using various tools and representations
		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
		C1.2 create algebraic expressions to generalize relationships expressed in words, numbers, and visual representations, in various contexts
C2.2 evaluate algebraic expressions that involve whole numbers and decimal numbers	C2.2 evaluate algebraic expressions that involve rational numbers	C1.3 compare algebraic expressions using concrete, numerical, graphical, and algebraic methods to identify those that are equivalent, and justify their choices
C2.1 add and subtract monomials with a degree of 1 that involve whole numbers, using tools	C2.1 add and subtract monomials with a degree of 1, and add binomials with a degree of 1 that involve integers, using tools	C1.4 simplify algebraic expressions by applying properties of operations of numbers, using various representations and tools, in different contexts
C2.3 solve equations that involve multiple terms, whole numbers, and decimal numbers in various contexts, and verify solutions	C2.3 solve equations that involve multiple terms, integers, and decimal numbers in various contexts, and verify solutions	C1.5 create and solve equations for various contexts, and verify their solutions
C3. solve problems and create computational representations of mathematical situations using coding concepts and skills	C3. solve problems and create computational representations of mathematical situations using coding concepts and skills	C2. apply coding skills to represent mathematical concepts and relationships dynamically, and to solve problems, in algebra and across the other strands
C2.4 solve inequalities that involve multiple terms and whole numbers, and verify and graph the solutions	C2.4 solve inequalities that involve integers, and verify and graph the solutions	C2.1 use coding to demonstrate an understanding of algebraic concepts including variables, parameters, equations, and inequalities
C3.1 solve problems and create computational representations of mathematical situations by writing and executing efficient code, including code that involves events influenced by a defined count and/or sub-program and other control structures	C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves the analysis of data in order to inform and communicate decisions	C2.2 create code by decomposing situations into computational steps in order to represent mathematical concepts and relationships, and to solve problems
C3.2 read and alter existing code, including code that involves events influenced by a defined count and/or sub-program and other control structures, and describe how changes to the code affect the outcomes and the efficiency of the code	C3.2 read and alter existing code involving the analysis of data in order to inform and communicate decisions, and describe how changes to the code affect the outcomes and the efficiency of the code	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

GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND C: Algebra By the end of this grade, students will:	STRAND C: Algebra By the end of this grade, students will:	STRAND C: Algebra By the end of this course, students will:
C1. identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts	C1. identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts	C3. represent and compare linear and non-linear relations that model real-life situations, and use these representations to make predictions
C1.1 identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts, and compare linear growing patterns on the basis of their constant rates and initial values	C1.1 identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts, and compare linear growing and shrinking patterns on the basis of their constant rates and initial values	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
C1.2 create and translate repeating, growing, and shrinking patterns involving whole numbers and decimal numbers using various representations, including algebraic expressions and equations for linear growing patterns	C1.2 create and translate repeating, growing, and shrinking patterns involving rational numbers using various representations, including algebraic expressions and equations for linear growing and shrinking patterns	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
		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
		C4. demonstrate an understanding of the characteristics of various representations of linear and non-linear relations, using tools, including coding when appropriate
		C4.1 compare characteristics of graphs, tables of values, and equations of linear and non-linear relations
C2.4 solve inequalities that involve multiple terms and whole numbers, and verify and graph the solutions	C2.4 solve inequalities that involve integers, and verify and graph the solutions	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
E1.4 describe and perform translations, reflections, and rotations on a Cartesian plane, and predict the results of these transformations	E1.4 describe and perform translations, reflections, rotations, and dilations on a Cartesian plane, and predict the results of these transformations	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 the equations of the defined lines
C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating, growing, and shrinking patterns involving whole numbers and decimal numbers, and use algebraic representations of the pattern rules to solve for unknown values in linear growing patterns	C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in growing and shrinking patterns involving rational numbers, and use algebraic representations of the pattern rules to solve for unknown values in linear growing and shrinking patterns	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 <i>y</i> -intercepts, and use these equations to solve problems

GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND D: Data By the end of this grade, students will:	STRAND D: Data By the end of this grade, students will:	STRAND D: Data By the end of this course, students will:
D1. manage, analyse, and use data to make convincing arguments and informed decisions, in various contexts drawn from real life	D1. manage, analyse, and use data to make convincing arguments and informed decisions, in various contexts drawn from real life	D1. describe how the collection and use of data have evolved, and represent and analyse data involving one and two variables
D1.1 explain why percentages are used to represent the distribution of a variable for a population or sample in large sets of data, and provide examples	D1.1 identify situations involving one- variable data and situations involving two- variable data, and explain when each type of data is needed	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
D1.6 analyse different sets of data presented in various ways, including in circle graphs and in misleading graphs, by asking and answering questions about the data, challenging preconceived notions, and drawing conclusions, then make convincing arguments and informed decisions	D1.6 analyse different sets of data presented in various ways, including in scatter plots and in misleading graphs, by asking and answering questions about the data, challenging preconceived notions, and drawing conclusions, then make convincing arguments and informed decisions	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
D1.5 determine the impact of adding or removing data from a data set on a measure of central tendency, and describe how these changes alter the shape and distribution of the data		
E2.4 construct circles when given the radius, diameter, or circumference		
	D1.5 use mathematical language, including the terms "strong", "weak", "none", "positive", and "negative", to describe the relationship between two variables for various data sets with and without outliers	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
C4. apply the process of mathematical modelling to represent, analyse, make predictions, and provide insight into reallife situations	C4. apply the process of mathematical modelling to represent, analyse, make predictions, and provide insight into real-life situations	D2. 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
		D2.1 describe the value of mathematical modelling and how it is used in real life to inform decisions
D1.2 collect qualitative data and discrete and continuous quantitative data to answer questions of interest, and organize the sets of data as appropriate, including using	D1.2 collect continuous data to answer questions of interest involving two variables, and organize the data sets as appropriate in a table of values	D2.2 identify a question of interest requiring the collection and analysis of data, and identify the information needed to answer the question
percentages		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

GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND D: Data By the end of this grade, students will:	STRAND D: Data By the end of this grade, students will:	STRAND D: Data By the end of this course, students will:
D1.3 select from among a variety of graphs, including circle graphs, the type of graph best suited to represent various sets of data; display the data in the graphs with proper sources, titles, and labels, and appropriate scales; and justify their choice of graphs D1.4 create an infographic about a data set, representing the data in appropriate ways, including in tables and circle graphs, and incorporating any other relevant information that helps to tell a story about the data	D1.3 select from among a variety of graphs, including scatter plots, the type of graph best suited to represent various sets of data; display the data in the graphs with proper sources, titles, and labels, and appropriate scales; and justify their choice of graphs D1.4 create an infographic about a data set, representing the data in appropriate ways, including in tables and scatter plots, and incorporating any other relevant information that helps to tell a story about the data	D2.4 determine ways to display and analyse the data in order to create a mathematical model to address the original question of interest, taking into account the nature of the data, the context, and the assumptions made
		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

GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND E: Spatial Sense By the end of this grade, students will:	STRAND E: Spatial Sense By the end of this grade, students will:	STRAND E: Geometry and Measurement By the end of this course, students will:
E1. describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them E2. compare, estimate, and determine measurements in various contexts	E1. describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them E2. compare, estimate, and determine measurements in various contexts	E1. 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
		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
E1.3 perform dilations and describe the similarity between the image and the original shape	E1.1 identify geometric properties of tessellating shapes and identify the transformations that occur in the tessellations	E1.2 create and analyse designs involving geometric relationships and circle and triangle properties, using various tools
	E2.2 solve problems involving angle properties, including the properties of intersecting and parallel lines and of polygons	

GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND E: Spatial Sense By the end of this grade, students will:	STRAND E: Spatial Sense By the end of this grade, students will:	STRAND E: Geometry and Measurement By the end of this course, students will:
E2.2 solve problems involving perimeter, area, and volume that require converting from one metric unit of measurement to another	E2.1 represent very large (mega, giga, tera) and very small (micro, nano, pico) metric units using models, base ten relationships, and exponential notation E1.3 use scale drawings to calculate actual lengths and areas, and reproduce scale	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
E2.3 use the relationships between the radius, diameter, and circumference of a circle to explain the formula for finding the circumference and to solve related problems E2.5 show the relationships between the radius, diameter, and area of a circle, and use these relationships to explain the formula for measuring the area of a circle and to solve related problems E1.2 draw top, front, and side views, as well as perspective views, of objects and physical spaces, using appropriate scales E2.6 represent cylinders as nets and determine their surface area by adding the areas of their parts	E2.3 solve problems involving the perimeter, circumference, area, volume, and surface area of composite two-dimensional shapes and three-dimensional objects, using appropriate formulas	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
	E2.4 describe the Pythagorean relationship using various geometric models, and apply the theorem to solve problems involving an unknown side length for a given right triangle B1.3 estimate and calculate square roots, in various contexts	E1.5 solve problems involving the side-length relationship for right triangles in real-life situations, including problems that involve composite shapes
E2.7 show that the volume of a prism or cylinder can be determined by multiplying the area of its base by its height, and apply this relationship to find the area of the base, volume, and height of prisms and cylinders when given two of the three measurements E2.1 describe the differences and similarities between volume and capacity, and apply the relationship between millilitres (mL) and cubic centimetres (cm³) to solve problems E1.1 describe and classify cylinders, pyramids, and prisms according to their geometric properties, including plane and rotational symmetry	E1.2 make objects and models using appropriate scales, given their top, front, and side views or their perspective views E2.3 solve problems involving the perimeter, circumference, area, volume, and surface area of composite two-dimensional shapes and three-dimensional objects, using appropriate formulas	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

GRADE 7 (2020)	GRADE 8 (2020)	GRADE 9 (2021)
STRAND F: Financial Literacy By the end of this grade, students will:	STRAND F: Financial Literacy By the end of this grade, students will:	STRAND F: Financial Literacy By the end of this course, students will:
F1. demonstrate the knowledge and skills needed to make informed financial decisions	F1. demonstrate the knowledge and skills needed to make informed financial decisions	F1. demonstrate the knowledge and skills needed to make informed financial decisions
F1.2 identify and describe various reliable sources of information that can help with planning for and reaching a financial goal F1.4 identify various societal and personal factors that may influence financial decision making, and describe the effects that each might have	F1.1 describe some advantages and disadvantages of various methods of payment that can be used when dealing with multiple currencies and exchange rates F1.2 create a financial plan to reach a long-term financial goal, accounting for income, expenses, and tax implications F1.5 compare various ways for consumers to get more value for their money when spending, including taking advantage of sales and customer loyalty and incentive programs, and determine the best choice for different scenarios	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
	F1.4 determine the growth of simple and compound interest at various rates using digital tools, and explain the impact interest has on long-term financial planning	F1.2 identify financial situations that involve appreciation and depreciation, and use associated graphs to answer related questions
F1.5 explain how interest rates can impact savings, investments, and the cost of borrowing to pay for goods and services over time F1.6 compare interest rates and fees for different accounts and loans offered by various financial institutions, and determine the best option for different scenarios	F1.6 compare interest rates, annual fees, and rewards and other incentives offered by various credit card companies and consumer contracts to determine the best value and the best choice for different scenarios	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
F1.3 create, track, and adjust sample budgets designed to meet longer-term financial goals for various scenarios	F1.3 identify different ways to maintain a balanced budget, and use appropriate tools to track all income and spending, for several different scenarios	F1.4 modify budgets displayed in various ways to reflect specific changes in circumstances, and provide a rationale for the modifications