Curriculum Connections (Fractions): K-8

Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	beyond
(no expectations)	**1m19** - divide whole objects into parts and identify and describe, through investigation, equal-sized parts of the whole, using fractional names (e.g., halves; fourths or quarters).	**2m15** - determine, through investigation using concrete materials, the relationship between the number of fractional parts of a whole and the size of the fractional parts (e.g., a paper plate divided into fourths has larger parts than a paper plate divided into eighths) (Sample problem: Use paper squares to show which is bigger, one half of a square or one fourth of a square.); **2m16 -** regroup fractional parts into wholes, using concrete materials (e.g., combine nine fourths to form two wholes and one fourth); **2m17 -** compare fractions using concrete materials, without using standard fractional notation (e.g., use fraction pieces to show that three fourths are bigger than one half, but smaller than one whole).	**3m17** - divide whole objects and sets of objects into equal parts, and identify the parts using fractional names (e.g., one half; three thirds; two fourths or two quarters), without using numbers in standard fractional notation.	**4m17** - represent fractions using concrete materials, words, and standard fractional notation, and explain the meaning of the denominator as the number of the fractional parts of a whole or a set, and the numerator as the number of fractional parts being considered; **4m18** - compare and order fractions (i.e., halves, thirds, fourths, fifths, tenths) by considering the size and the number of fractional parts (e.g., 4/5 is greater than 3/5 because there are more parts in 4/5; ¼ is greater than 1/5 because the size of the part is larger in ¼); **4m19** - compare fractions to the benchmarks of 0, ½ and 1 (e.g., 1/8 is closer to 0 than ½; 3/5 is more than ½); **4m20** - demonstrate and explain the relationship between equivalent fractions, using concrete materials (e.g., fraction circles, fraction strips, pattern blocks) and drawings; **4m23** - count forward by halves, thirds, fourths, and tenths to beyond one whole, using concrete materials and number lines (e.g., use fraction circles to count fourths: “One fourth, two fourths, three fourths, four fourths, five fourths, six fourths, …”); **4m36** - determine and explain, through investigation, the relationship between fractions (i.e., halves, fifths, tenths) and decimals to tenths, using a variety of tools (e.g., concrete materials, drawings, calculators) and strategies (e.g., decompose 2/5 into 4/10 by dividing each fifth into two equal part to show that 2/5 can be represented as 0.4).	**5m16** - represent, compare, and order fractional amounts with like denominators, including proper and improper fractions and mixed numbers, using a variety of tools (e.g., fraction circles, Cuisenaire rods, number lines) and using standard fractional notation; **5m17** - demonstrate and explain the concept of equivalent fractions, using concrete materials (e.g., use fraction strips to show that ¾ is equal to 9/12); **5m28** - describe multiplicative relationships between quantities by using simple fractions and decimals (e.g., “If you have 4 plums and I have 6 plums, I can say that I have 1 ½ or 1.5 times as many plums as you have.”); **5m29** - determine and explain, through investigation using concrete materials, drawings, and calculators, the relationship between fractions (i.e., with denominators of 2, 4, 5, 10, 20, 25, 50, and 100) and their equivalent decimal forms (e.g., use a 10 x 10 grid to show that 2/5 = 40/100, which can also be represented as 0.4).	**6m14** - represent, compare, and order fractional amounts with unlike denominators, including proper and improper fractions and mixed numbers, using a variety of tools and using standard fractional notation; **6m26** - represent ratios found in real-life contexts, using concrete materials, drawings, and standard fractional notation; **6m27** - determine and explain, through investigation using concrete materials, drawings, and calculators, the relationships among fractions, decimal numbers, and percents.	**7m11 -** represent, compare, and order decimals to hundredths and fractions, using a variety of tools; **7m15 -** select and justify the most appropriate representation of a quantity (i.e., fraction, decimal, percent) for a given context; **7m18 -** divide whole numbers by simple fractions and by decimal numbers to hundredths, using concrete materials; **7m19 -** use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals; **7m24 -** add and subtract fractions with simple like and unlike denominators, using a variety of tools and algorithms; **7m25 -** demonstrate, using concrete materials, the relationship between the repeated addition of fractions and the multiplication of that fraction by a whole number; **7m27 -** determine, through investigation, the relationships among fractions, decimals, percents, and ratios; **7m83 -** research and report on everyday applications of probabilities expressed in fraction, decimal, and percent form.	**8m13 -** represent, compare, and order rational numbers; **8m14 -** translate between equivalent forms of a number; **8m18 -** use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution; **8m19 -** represent the multiplication and division of fractions, using a variety of tools and strategies; **8m20 -** solve problems involving addition, subtraction, multiplication, and division with simple fractions.	In Grades 9-12 students apply and extend their knowledge and skill with fractions in a variety of contexts, including: • algebraic expressions • proportional reasoning • rate of change • trigonometry • measurement

Connections across Strands (Fractions): K-8

Note
This chart shows the expectations that explicitly call for work with fractions or allow incorporation of fractional values. Summary or synthesis of curriculum expectations are in plain font. Verbatim curriculum expectations are in italics.

Strand	before	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Beyond (a sample)
Number Sense and Numeration	• compose and decompose numbers • explore equal sharing of whole number quantities • ***3m16 -*** *represent and explain, using concrete materials, the relationship among the numbers 1, 10, 100, 1000* • ***3m18 -*** *represent and describe the relationships between coins and bills up to $10*	• ***4m8 -*** *represent, compare, and order decimal numbers to tenths, using a variety of tools and using standard decimal notation* • ***4m24 -*** *count forward by tenths from any decimal number expressed to one decimal place, using concrete materials and number lines* • ***4m27 -*** *add and subtract decimal numbers to tenths, using concrete materials and student-generated algorithms*	• ***5m12 -*** *represent, compare, and order whole numbers and decimal numbers from 0.01 to 100 000, using a variety of tools* • ***5m17****– demonstrate and explain the concept of equivalent fractions, using concrete materials (e.g., use fraction strips to show that); 3/4 is equal to9/12* • ***5m18 -*** *demonstrate and explain equivalent representations of a decimal number, using concrete materials and drawings* • ***5m21 -*** *count forward by hundredths from any decimal number expressed to two decimal places, using concrete materials and number lines* • ***5m30 -*** *demonstrate an understanding of simple multiplicative relationships involving whole-number rates, through investigation using concrete materials and drawings*	• ***6m15 -*** *estimate quantities using benchmarks of 10%, 25%, 50%, 75%, and 100%* • ***6m11 -*** *represent, compare, and order whole numbers and decimal numbers from 0.001 to 1 000 000, using a variety of tools* • add, subtract, multiply and divide decimal numbers • ***6m24 -*** *use estimation when solving problems involving the addition and subtraction of whole numbers and decimals, to help judge the reasonableness of a solution* • ***6m28 -*** *represent relationships using unit rates*	• ***7m12 -*** *generate multiples and factors of given numbers* • solve problems involving whole number percents • demonstrate an understanding of rate • solve problems involving unit rates	• determine common factors and multiples • solve problems involving proportions • solve problems involving percent	• apply properties of fractions to algebraic rational expressions • manipulate algebraic expressions by substituting fractional values in • manipulate and solve for rational exponents
Measurement	• use fractional concepts in telling and writing time • estimate the measure of an object (area, perimeter, volume, mass) using standard and non-standard units	• ***4m42 -*** *estimate, measure, and represent time intervals to the nearest minute* • ***4m48 -*** *describe, through investigation, the relationship between various units of length*	• ***5m33 -*** *estimate, measure (i.e., using an analogue clock), and represent time intervals to the nearest second;* • ***5m38 -*** *solve problems requiring conversion from metres to centimetres and from kilometers to metres*	• ***6m32 -*** *estimate, measure, and record length, area, mass, capacity, and volume, using the metric measurement system* • ***6m34 -*** *solve problems requiring conversion from larger to smaller metric units* • ***6m36 -*** *determine, through investigation using a variety of tools and strategies the relationship between the area of a rectangle and the areas of parallelograms and triangles, by decomposing and composing* • ***6m37 -*** *develop the formulas for the area of a parallelogram using the area relationships among rectangles, parallelograms, and triangles* • ***6m38 -*** *solve problems involving the estimation and calculation of the areas of triangles and the areas of parallelograms* • ***6m39 -*** *determine, using concrete materials, the relationship between units used to measure area (i.e., square centimetre, square metre), and apply the relationship to solve problems that involve conversions from square metres to square centimeters* • ***6m 40 -*** *determine, through investigation using a variety of tools and strategies the relationship between the height, the area of the base, and the volume of a triangular prism, and generalize to develop the formula*	• use fraction skills in solving problems involving measurement, e.g., the area of a trapezoid	• use fraction skills in solving problems involving measurement, e.g., the area of a circle	• solve problems involving area of composite figures, involving triangles and/or trapezoids • ***Gr. 9 Applied (MG2.04) Gr. 9 Academic (MG2.06) -*** *develop, through investigation, the formulas for the volume of a pyramid or cone* • solve problems involving the volume of pyramids or cones • use proportional reasoning to solve similar triangles problems • determine, through investigation, the trigonometric ratios of sine, cosine, and tangent as ratios presented as fractions • use proportional reasoning to solve for triangle measures using Sine Law and Cosine Law • solve problems involving measures in right-angled

Strand	before	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Beyond (a sample)
Geometry and Spatial Sense	• determining lines of symmetry of two-dimensional shapes • ***1m44 -*** *compose and decompose two-dimensional shapes* • ***2m57 -*** *draw simple maps of familiar settings, and describe the relative locations of objects on the maps* • ***1m57 -*** *create and describe symmetrical designs using a variety of tools* • ***3m55 -*** *solve problems requiring the greatest or least number of two-dimensional shapes needed to compose a larger shape in a variety of ways*	• ***4m63 -*** *identify benchmark angles using a reference tool*	•	• ***6m47 -*** *sort polygons according to the number of lines of symmetry and the order of rotational symmetry, through investigation using a variety of tools*	• use fractions to describe reductions in dilatation and in reducing two-dimensional shapes to create similar figures • use fractions to describe related lines, e.g., perpendicular lines meet at 90° which is ½ of 180° • plot points on the Cartesian plane with simple fractional coordinates	• graph the image of a point on the Cartesian plane with simple fractional coordinates • determine relationships; area, perimeter, and side length of similar shapes, e.g., if 2 triangles are similar and the perimeter of one is ½ the perimeter of the other, compare their areas	triangles and in non-right angled triangles
Patterning and Algebra	• partitioning whole numbers using whole numbers	•	• ***5m63 -*** *create, identify, and extend numeric and geometric patterns, using a variety of tools*	• ***6m61 -*** *determine a term, given its term number, by extending growing and shrinking patterns that are generated by adding or subtracting a constant, or multiplying or dividing by a constant, to get the next term*	• model everyday relationships involving rates • translate phrases into algebraic expressions	• ***8m62 -*** *evaluate algebraic expressions with up to three terms, by substituting fractions, decimals, and integers for the variables* • translate statements into algebraic expressions and equations	• interpret points on a scatterplot • collect data, describe trends • construct tables of values and graphs for data • solve equations involving fractional coefficients • determine and describe rates of change • use initial value and rate of change to express a linear relation • determine a point of intersection of two linear relationships • solve problems involving quadratic relations • represent and apply sequences and series • use fractions in probability, including permutations and combinations
Data Management and Probability	• using fractional concepts but not fractional terminology to discuss and explore probability e.g., more likely, less likely.	• ***4m90 -*** *read, interpret, and draw conclusions from primary data and from secondary data presented in charts, tables, and graphs* • ***4m91 -*** *demonstrate, through investigation, an understanding of median and determine the median of a set of data* • ***4m93 -*** *compare similarities and differences between two related sets of data, using a variety of strategies* • ***4m94 -*** *predict the frequency of an outcome in a simple probability experiment*	• ***5m74 -*** *distinguish between discrete data (i.e., data organized using numbers that have gaps between them, such as whole numbers, and often used to represent a count, such as the number of times a word is used) and continuous data* • ***5m76 -*** *collect and organize discrete or continuous primary data and secondary data and display the data in charts, tables, and graphs that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools* • ***5m81 -*** *compare similarities and differences between two related sets of data, using a variety of strategies* • ***5m82 -*** *determine and represent all the possible outcomes in a simple probability experiment using systematic lists and area models;* • ***5m83 -*** *represent, using a common fraction, the probability that an event will occur in simple games and probability experiments*	• ***6m67 -*** *collect and organize discrete or continuous primary data and secondary data and display the data in charts, tables, and graphs that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools* • ***6m74 -*** *read, interpret, and draw conclusions from primary data and from secondary data presented in charts, tables, and graphs* • ***6m76 -*** *explain how different scales used on graphs can influence conclusions drawn from the data;* • ***6m77 -*** *demonstrate an understanding of mean and use the mean to compare two sets of related data, with and without the use of technology* • ***6m79 -*** *express theoretical probability as a ratio of the number of favourable outcomes to the total number of possible outcomes, where all outcomes are equally likely* • ***6m80 -*** *represent the probability of an event using a value from the range of 0 to 1* • ***6m81 -*** *predict the frequency of an outcome of a simple probability experiment or game, by calculating and using the theoretical probability of that outcome*	• use fractions to express the experimental and theoretical probability of an event • ***7m83 -*** *research and report on real-world applications of probabilities expressed in fraction, decimal, and percent form* • ***7m85 -*** *determine the theoretical probability of a specific outcome involving two independent events*	• use fractions to express the experimental and theoretical probability of an event • ***8m82 -*** *identify the complimentary event for a given event, and calculate the theoretical probability that a given event will not occur*	