Leaps and Bounds Toward Math Understanding Correlation to Ontario Curriculum and Grade 4 Classroom Resources

Note: *Leaps and Bounds 3/4 is a math intervention resource and therefore does not include new content and concepts being introduced to students for the first time in Grade 4. Leaps and Bounds includes content from Grades 1 to 3 that will prepare students who are struggling for work at the Grade 3 or 4 level.*

GRADE 4 Expectations and Resources Correlation between Grade 4 Ontario expectations and core programs			**INTERVENTION Resources and Expectations** Correlation between *Leaps and Bounds 3/4* and prerequisite expectations from Ontario Grades 1 to 3			
Number Sense and Numeration: Quantity Relationships						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– represent, compare, and order whole numbers to 10 000, using a variety of tools (e.g., drawings of base ten materials, number lines with increments of 100 or other appropriate amounts)	Chapter 2 Getting Started, 2.1, 2.2, 2.3, 2.4, 2.7, Ch. 2 Task	Chapter 2 Whole Numbers, 2.1, 2.3	**Representing Whole Numbers** *Pathway 1*: Representing Numbers to 1000 *Pathway 2*: Representing Numbers to 100 *Pathway 3*: Representing Numbers to 20 **Comparing and Ordering** *Pathway 1*: Comparing and Ordering to 1000 *Pathway 2*: Comparing and Ordering to 100 *Pathway 3*: Comparing and Ordering to 20	– represent, compare, and order whole numbers to 1000, using a variety of tools (e.g., base ten materials or drawings of them, number lines with increments of 100 or other appropriate amounts)	– represent, compare, and order whole numbers to 100, including money amounts to 100¢, using a variety of tools (e.g., ten frames, base ten materials, coin manipulatives, number lines, hundreds charts and hundreds carpets)	– represent, compare, and order whole numbers to 50, using a variety of tools (e.g., connecting cubes, ten frames, base ten materials, number lines, hundreds charts) and contexts (e.g., real-life experiences, number stories)

Number Sense and Numeration: Quantity Relationships ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– demonstrate an understanding of place value in whole numbers and decimal numbers from 0.1 to 10 000, using a variety of tools and strategies (e.g., use base ten materials to represent 9307 as 9000 + 300 + 0 + 7)	Ch. 2 Getting Started, 2.1, 2.2, 2.4, Ch. 2 Task, 12.4, 12.5	Chapter 2 Whole Numbers, 2.1, 2.3, Chapter 8 Fractions and Decimals, 8.8	**Representing Whole Numbers** *Pathway 1*: Representing Numbers to 1000 *Pathway 2*: Representing Numbers to 100 *Pathway 3*: Representing Numbers to 20 **Comparing and Ordering** *Pathway 1*: Comparing and Ordering to 1000 *Pathway 2*: Comparing and Ordering to 100 *Pathway 3*: Comparing and Ordering to 20	– identify and represent the value of a digit in a number according to its position in the number (e.g. use base ten materials to show that the 3 in 324 represents 300) – compose and decompose three-digit numbers into hundreds, tens, and ones in a variety of ways, using concrete materials (e.g., use base ten materials to decompose 327 into 3 hundreds, 2 tens, and 7 ones, or into 2 hundreds, 12 tens, and 7 ones) – represent and explain, using concrete materials, the relationship among the numbers 1, 10, 100, and 1000	– determine, using concrete materials, the ten that is nearest to a given two-digit number, and justify the answer (e.g., use counters on ten frames to determine that 47 is closer to 50 than to 40) – compose and decompose two-digit numbers in a variety of ways, using concrete materials (e.g., place 42 counters on ten frames to show 4 tens and 2 ones; compose 37¢ using one quarter, one dime, and two pennies)	– demonstrate, using concrete materials, the concept of conservation of number (e.g., 5 counters represent the number 5, regardless whether they are close together or far apart) – relate numbers to the anchors of 5 and 10 (e.g., 7 is 2 more than 5 and 3 less than 10) – compose and decompose numbers up to 20 in a variety of ways, using concrete materials (e.g., 7 can be decomposed using connecting cubes into 6 and 1, or 5 and 2, or 4 and 3)
– read and print in words whole numbers to one thousand, using meaningful contexts (e.g., books, highway distance signs)	2.2	Chapter 2 Whole Numbers, 2.1	**Representing Whole Numbers** *Pathway 1*: Representing Numbers to 1000 *Pathway 2*: Representing Numbers to 100 *Pathway 3*: Representing Numbers to 20 **Comparing and Ordering** *Pathway 1*: Comparing and Ordering to 1000 *Pathway 2*: Comparing and Ordering to 100 *Pathway 3*: Comparing and Ordering to 20	– read and print in words whole numbers to 100, using meaningful contexts (e.g., books, speed limits signs)	– read and print in words whole numbers to twenty, using meaningful contexts (e.g., storybooks, posters, signs)	– read and print in words whole numbers to ten, using meaningful contexts (e.g., storybooks, posters)

Number Sense and Numeration: Quantity Relationships ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– round four-digit whole numbers to the nearest ten, hundred, and thousand, in problems arising from real-life situations	2.6, Ch. 2 Task	Chapter 2 Whole Numbers 2.2		– round two-digit numbers to the nearest ten, in problems arising from real-life situations		– estimate the number of objects in a set, and check by counting (e.g., "I guessed that there were 20 cubes in the pile. I counted them and there were only 17 cubes. 17 is close to 20.")
– represent, compare, and order decimal numbers to tenths, using a variety of tools (e.g., concrete materials such as paper strips divided into tenths and base ten materials, number lines, drawings) and using standard decimal notation	12.4, 12.5, Ch. 12 Task	Chapter 8 Fractions and Decimals, 8.8				
– 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	Ch. 12 Getting Started, 12.1, Ch. 12 Task	Chapter 8 Fractions and Decimals, 8.1, 8.3	**Fractions** *Pathway 1*: Fractions as Parts of Sets *Pathway 2*: Fractions as Parts of Wholes *Pathway 3*: Halves	– 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	– 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) – regroup fractional parts into wholes, using concrete materials (e.g., combine nine fourths to form two wholes and one fourth)	– 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)

Number Sense and Numeration: Quantity Relationships ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– 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; 1/4 is greater than 1/5 because the size of the part is larger in 1/4)	12.1	Chapter 8 Fractions and Decimals, 8.7 with supporting TG note	**Fractions** *Pathway 2*: Fractions as Parts of Wholes		– 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)	
– compare fractions to the benchmarks of 0, 1/2, and 1 (e.g., 1/8 is closer to 0 than 1/2; 3/5 is more than 1/2)	Ontario Supplement: Ch. 12 Lesson C: Equivalent Fractions	Chapter 8 Fractions and Decimals, 8.2				
– demonstrate and explain the relationship between equivalent fractions, using concrete materials (e.g., fraction circles, fraction strips, pattern blocks) and drawings (e.g., "I can say that 3/6 of my cubes are white, or that half of the cubes are white. This means that 3/6 and 1/2 are equal)	Ontario Supplement: Ch. 12 Lesson C: Equivalent Fractions	Chapter 8 Fractions and Decimals, 8.5				

Number Sense and Numeration: Quantity Relationships ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– read and represent money amounts to $100 (e.g., five dollars, two quarters, one nickel, and four cents is $5.59)	2.8	Chapter 6 Measurement, 6.5, 6.6	**Skip Counting** *Pathway 1*: Skip Counting to 1000 *Pathway 2*: Skip Counting to 100	– represent and describe the relationships between coins and bills up to $10 (e.g., "There are eight quarters in a toonie and ten dimes in a loonie.") – estimate, count, and represent (using the $ symbol) the value of a collection of coins and bills with a maximum value of $10	– estimate, count, and represent (using the ¢ symbol) the value of a collection of coins with a maximum value of one dollar.	– identify and describe various coins (i.e., penny, nickel, dime, quarter, $1 coin, $2 coin), using coin manipulatives or drawings, and state their value (e.g., the value of a penny is one cent; the value of a toonie is two dollars) – represent money amounts to 20¢, through investigation using coin manipulatives
– solve problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 10 000	Ch. 2 Getting Started, 2.1, 2.2, 2.3, 2.6, 2.7, Ch. 2 Task	Chapter 2 Whole Numbers, 2.1 with supporting BLM	**Representing Whole Numbers** **Comparing and Ordering** **Skip Counting**	– solve problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 1000		

Number Sense and Numeration: Counting						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
			Skip Counting *Pathway 1*: Skip Counting to 1000 *Pathway 2*: Skip Counting to 100 *Pathway 3*: Skip Counting to 20	– count forward by 1's, 2's, 5's, 10's, and 100's to 1000 from various starting points, and by 25's to 1000 starting from multiples of 25, using a variety of tools and strategies (e.g., skip count with and without the aid of a calculator; skip count by 10's using dimes) – count backwards by 2's, 5's, and 10's from 100 using multiples of 2, 5, and 10 as starting points, and count backwards by 100's from 1000 and any number less than 1000, using a variety of tools (e.g., number lines, calculators, coins) and strategies	– count forward by 1's, 2's, 5's, 10's, and 25's to 200, using number lines and hundreds charts, starting from multiples of 1, 2, 5, and 10 (e.g., count by 5's from 15; count by 25's from 125) – count backwards by 1's from 50 and any number less than 50, and count backwards by 10's from 100 and any number less than 100, using number lines and hundreds charts – locate whole numbers to 100 on a number line and on a partial number line (e.g., locate 37 on a partial number line that goes from 34 to 41)	– demonstrate, using concrete materials, the concept of one-to-one correspondence between number and objects when counting – count forward by 1's, 2's, 5's, and 10's to 100, using a variety of tools and strategies (e.g., move with steps; skip count on a number line; place counters on a hundreds chart; connect cubes to show equal groups; count groups of pennies, nickels, or dimes) – count backwards by 1's from 20 and any number less than 20 (e.g., count backwards from 18 to 11), with and without the use of concrete materials and number lines – count backwards from 20 by 2's and 5's, using a variety of tools (e.g., number lines, hundreds charts) – use ordinal numbers to thirty-first in meaningful contexts (e.g., identify the days of the month on a calendar)

Grade 4 Ontario expectations	*Nelson Mathematics 4*	*Math Makes Sense 4*	*Leaps and Bounds 3/4* Topics	Grade 3 Ontario expectations	Grade 2 Ontario expectations	Grade 1 Ontario expectations
Number Sense and Numeration: Counting						
– 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, …") – count forward by tenths from any decimal number expressed to one decimal place, using concrete materials and number lines (e.g., use base ten materials to represent 3.7 and count forward: 3.8, 3.9, 4.0, 4.1, …; "Three and seven tenths, three and eight tenths, three and nine tenths, four, four and one tenth, …")	Ontario Supplement: Ch. 12 Lesson E: Counting Patterns	Chapter 8 Fractions and Decimals, 8.1, 8.8 with supporting TG note	**Fractions** *Pathway 1*: Fractions as Parts of Sets *Pathway 2*: Fractions as Parts of Wholes *Pathway 3*: Halves	– 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	– 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)	– 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)
Number Sense and Numeration: Operational Sense						
– add and subtract two-digit numbers, using a variety of mental strategies (e.g., one way to calculate 73 – 39 is to subtract 40 from 73 to get 33, and then add 1 back to get 34)	Ch. 1 Mental Math, 4.1, Ch. 4 Mental Math, 4.5, Ch. 6 Mental Math, Ch. 10 Mental Math	Chapter 2 Whole Numbers, 2.5, 2.9 with supporting TG notes	**Adding Whole Numbers** *Pathway 1*: Adding Three-Digit Numbers *Pathway 2*: Adding Two-Digit Numbers *Pathway 3*: Adding One-Digit Numbers **Subtracting Whole Numbers** *Pathway 1*: Subtracting Three-Digit Numbers *Pathway 2*: Subtracting Numbers to 100 *Pathway 3*: Subtracting Numbers to 20 **Mental Math** *Pathway 1*: Compensating *Pathway 2*: Regrouping *Pathway 3*: Relating to 5 or 10	– solve problems involving the addition and subtraction of two-digit numbers, using a variety of mental strategies (e.g., to add 37 + 26, add the tens, add the ones, then combine the tens and one like this: 30 + 20 = 50, 7 + 6 = 13, 50 + 13 = 63)	– solve problems involving the addition and subtraction of whole numbers to 18, using a variety of mental strategies (e.g., "To add 6 + 8, I could double 6 and get 12 and then add 2 more to get 14.")	– solve problems involving the addition and subtraction of single-digit whole numbers, using a variety of mental strategies (e.g., one more than, one less than, counting on, counting back, doubles)

Number Sense and Numeration: Operational Sense ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– solve problems involving the addition and subtraction of four-digit numbers, using student-generated algorithms and standard algorithms (e.g., "I added 4217 + 1914 using 5000 + 1100 + 20 + 11.")	Ch. 4 Getting Started, 4.4, Ch. 4 Math Game (Race to 150), Math Game (River Crossing), 4.7, Ch. 4 Curious Math (Hidden Digits), 4.8, Ch. 4 Task	Chapter 2 Whole Numbers, 2.6, 2.7, 2.8, 2.8, 2.10, 2.11	**Adding Whole Numbers** *Pathway 1*: Adding Three-Digit Numbers *Pathway 2*: Adding Two-Digit Numbers *Pathway 3*: Adding One-Digit Numbers **Subtracting Whole Numbers** *Pathway 1*: Subtracting Three-Digit Numbers *Pathway 2*: Subtracting Numbers to 100 *Pathway 3*: Subtracting Numbers to 20	– add and subtract three-digit numbers, using concrete materials, student-generated algorithms, and standard algorithms	– solve problems involving the addition and subtraction of two-digit numbers, with and without regrouping, using concrete materials (e.g., base ten materials, counters), student-generated algorithms, and standard algorithms	– solve a variety of problems involving the addition and subtraction of whole numbers to 20, using concrete materials and drawings (e.g., pictures, number lines)
– add and subtract decimal numbers to tenths, using concrete materials (e.g., paper strips divided into tenths, base ten materials) and student-generated algorithms (e.g., "When I added 6.5 and 5.6, I took five tenths in fraction circles and added six tenths in fraction circles to give me one whole and one tenth. Then I added 6 + 5 + 1.1, which equals 12.1.")	12.6, 12.7, 12.8	Chapter 8 Fractions and Decimals, 8.11, 8.12				
– add and subtract money amounts by making simulated purchases and providing change for amounts up to $100, using a variety of tools (e.g., currency manipulatives, drawings)	4.9, 4.10, Ch. 9 Mental Math, Ch. 12 Mental Math	Chapter 8 Fractions and Decimals, 8.13		– add and subtract money amounts, using a variety of tools (e.g., currency manipulatives, drawings), to make simulated purchases and change for amounts up to $10	– add and subtract money amounts to 100¢, using a variety of tools (e.g., concrete materials, drawings) and strategies (e.g., counting on, estimating, representing using symbols)	– add and subtract money amounts to 10¢, using coin manipulatives and drawings

Number Sense and Numeration: Operational Sense ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– multiply to 9 x 9 and divide to 81 ÷ 9, using a variety of mental strategies (e.g., doubles, doubles plus another set, skip counting) – solve problems involving the multiplication of one-digit whole numbers, using a variety of mental strategies (e.g., 6 x 8 can be thought of as 5 x 8 + 1 x 8)	Ch. 6 Getting Started, 6.1, 6.2, 6.3, 6.4, 6.6, Ch. 6 Curious Math (Multiplying and Dividing with 0), 6.7, 6.8, 6.9, Ch. 6 Curious Math (Multiplying with 9), 6.10, Ch. 6 Curious Math (Circles and Digits), Ch. 6 Task, Ch. 9 Getting Started, Ch. 9 Curious Math (Persistent Numbers), Ch. 9 Curious Math (Sum and Product), Ch. 10 Getting Started	Chapter 4 Multiplication and Division, 4.1, 4.2, 4.3, 4.8, 4.9, 4.10		– multiply to 7 x 7 and divide to 49 ÷ 7, using a variety of mental strategies (e.g., doubles, doubles plus another set, skip counting) – relate multiplication of one-digit numbers and division by one-digit divisors to real life situations, using a variety of tools and strategies (e.g., place objects in equal groups, use arrays, write repeated addition or subtraction sentences)	– represent and explain, through investigation using concrete materials and drawings, multiplication as the combining of equal groups (e.g., use counters to show that 3 groups of 2 is equal to 2 + 2 + 2 and to 3 x 2)	
– multiply whole numbers by 10, 100, and 1000, and divide whole numbers by 10 and 100, using mental strategies (e.g., use a calculator to look for patterns and generalize to develop a rule)	2.5, Ch. 2 Math Game (Getting to 10 000)	Chapter 4 Multiplication and Division, 4.4 with supporting BLM				
– multiply two-digit whole numbers by one-digit whole numbers, using a variety of tools (e.g., base ten materials or drawings of them, arrays), student-generated algorithms, and standard algorithms	9.1, 9.2, 9.3, 9.4, 9.7, Ch. 9 Task	Chapter 4 Multiplication and Division, 4.6, Chapter 10 Patterns in Number and Geometry, 10.2		– multiply to 7 x 7 and divide to 49 ÷ 7, using a variety of mental strategies (e.g., doubles, doubles plus another set, skip counting) – relate multiplication of one-digit numbers and division by one-digit divisors to real life situations, using a variety of tools and strategies (e.g., place objects in equal groups, use arrays, write repeated addition or subtraction sentences)		

Number Sense and Numeration: Operational Sense ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– divide two-digit whole numbers by one-digit whole numbers, using a variety of tools (e.g., concrete materials, drawings) and student-generated algorithms	10.1, 10.2, 10.3, 10.4, 10.5, Ch. 10 Math Game (Remainder Hunt)	Chapter 4 Multiplication and Division, 4.11, 4.12, Chapter 10 Patterns in Number and Geometry, 10.7		– multiply to 7 x 7 and divide to 49 ÷ 7, using a variety of mental strategies (e.g., doubles, doubles plus another set, skip counting) – relate multiplication of one-digit numbers and division by one-digit divisors to real life situations, using a variety of tools and strategies (e.g., place objects in equal groups, use arrays, write repeated addition or subtraction sentences)	– represent and explain, through investigation using concrete materials and drawings, division as the sharing of a quantity equally (e.g., "I can share 12 carrot sticks equally among 4 friends by giving each person 3 carrot sticks.")	
– use estimation when solving problems involving the addition, subtraction, and multiplication of whole numbers, to help judge the reasonableness of a solution	Ch. 4 Getting Started, 4.2, 4.3, 4.4, 4.6, 4.7, 4.8, 4.9, Ch. 4 Task, 9.2, 9.7, Ch. 9 Task	Chapter 2 Whole Numbers, 2.4, 2.8, Chapter 4 Multiplication and Division, 4.5		– use estimation when solving problems involving addition and subtraction, to help judge the reasonableness of a solution		
Number Sense and Numeration: Proportional Relationships						
– describe relationships that involve simple whole-number multiplication (e.g., "If you have 2 marbles and I have 6 marbles, I can say that I have three times the number of marbles you have.")	6.3	Chapter 4 Multiplication and Division, 4.2, 4.3 with supporting TG notes			– describe relationships between quantities by using whole-number addition and subtraction (e.g., "If you ate 7 grapes and I ate 12 grapes, I can say that I ate 5 more grapes than you did, or you ate 5 fewer grapes than I did.")	

Number Sense and Numeration: Proportional Relationships ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– 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 parts to show that 2/5 can be represented as 0.4)	12.4	Chapter 8 Fractions and Decimals, 8.8, Technology feature, page 297, with supporting TG notes	**Fractions** *Pathway 1*: Fractions as Parts of Sets *Pathway 2*: Fractions as Parts of Wholes *Pathway 3*: Halves	– 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	– 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)	– 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)
– demonstrate an understanding of simple multiplicative relationships involving unit rates, through investigation using concrete materials and drawings (e.g., scale drawings in which 1 cm represents 2 m)	6.5, 6.6, 6.7, 6.9, Ch. 8 Task, 9.1, 9.2, 9.3, 9.7, Ch. 9 Task	Chapter 10 Patterns in Number and Geometry, 10.4 with supporting TG note				
Measurement: Attributes, Units, and Measurement Sense						
			Time *Pathway 1*: Reading a Clock *Pathway 2*: Time: Using Standard Units	– read time using analogue clocks, to the nearest five minutes, and using digital clocks (e.g., 1:23 means twenty-three minutes after one o'clock), and represent time in 12-hour notation	– tell and write time to the quarter-hour, using demonstration digital and analogue clocks (e.g., "My clock shows the time recess will start [10:00], and my friend's clock shows the time recess will end [10:15].")	– read demonstration digital and analogue clocks, and use them to identify benchmark times (e.g., times for breakfast, lunch, dinner; the start and end of school; bedtime) and to tell and write time to the hour and half-hour in everyday settings – name the months of the year in order, and read the date on a calendar

Measurement: Attributes, Units, and Measurement Sense ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– estimate, measure, and record length, height, and distance, using standard units (i.e., millimetre, centimetre, metre, kilometre (e.g., a pencil that is 75 mm long)	5.1, 5.2, 5.3, Ch. 5 Curious Math (Cutting and Measuring), Ch. 5 Mental Imagery, Ch. 5 Task, 12.5, 12.6, 12.7	Chapter 9 Length, Perimeter, and Area, 9.1, 9.2	**Length** *Pathway 1*: Length: Standard Units *Pathway 2*: Length: Non-Standard Units	– estimate, measure, and record length, height, and distance, using standard units (i.e., centimetre, metre, kilometre)	– estimate and measure length, height, and distance, using standard units (i.e., centimetre, metre) and non-standard units – choose benchmarks – in this case, personal referents – for a centimetre and a metre (e.g., "My little finger is about as wide as one centimetre. A really big step is about one metre.") to help them perform measurement tasks – select and justify the choice of a standard unit (i.e., centimetre or metre) or a nonstandard unit to measure length (e.g., "I needed a fast way to check that the two teams would race the same distance, so I used paces.")	– demonstrate an understanding of the use of non-standard units of the same size (e.g., straws, index cards) for measuring – estimate, measure (i.e., by placing nonstandard units repeatedly, without overlaps or gaps), and record lengths, heights, and distances (e.g., a book is about 10 paper clips wide; a pencil is about 3 toothpicks long) – construct, using a variety of strategies, tools for measuring lengths, heights, and distances in non-standard units (e.g., footprints on cash register tape or on connecting cubes)
– estimate, measure (i.e., using an analogue clock), and represent time intervals to the nearest minute – estimate and determine elapsed time, with and without using a time line, given the durations of events expressed in five-minute intervals, hours, days, weeks, months, or years	5.6, 5.7	Chapter 6 Measurement, 6.1, 6.2, 6.3, 6.4 with supporting TG note	**Time** *Pathway 2*: Time: Using Standard Units *Pathway 3*: Time: Using Non-Standard Units		– construct tools for measuring time intervals in non-standard units (e.g., a particular bottle of water takes about five seconds to empty)	– estimate, measure, and describe the passage of time, through investigation using nonstandard units (e.g., number of sleeps; number of claps; number of flips of a sand timer)

Measurement: Attributes, Units, and Measurement Sense ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– draw items using a ruler, given specific lengths in millimetres or centimetres	5.3	Chapter 9 Length, Perimeter, and Area, 9.1, 9.2	**Length** **Pathway 1: Length: Standard Units**	– draw items using a ruler, given specific lengths in centimetres	– record and represent measurements of length, height, and distance in a variety of ways (e.g., written, pictorial, concrete)	
– estimate, measure using a variety of tools (e.g., centimetre grid paper, geoboard) and strategies, and record the perimeter and area of polygons	Ch. 5 Getting Started, 5.5, Ch. 5 Task, Ch. 8 Getting Started, 8.1, Ch. 8 Mental Imagery, 8.2, Ch. 8 Math Game (Area Logic), 8.3, Ch. 8 Curious Math (Area on Board), 8.4, 8.5, 8.6, Ch. 8 Task	Chapter 9 Length, Perimeter, and Area, 9.6, 9.7, 9.8, 9.9, 9.10, 9.11	**Length** *Pathway 1*: Length: Standard Units *Pathway 2*: Length: Non-Standard Units **Area** *Pathway 1*: Area: Using Strategies *Pathway 2*: Area: Using Whole Units	– estimate, measure, and record the perimeter of two-dimensional shapes, through investigation using standard units – estimate, measure (i.e., using centimetre grid paper, arrays), and record area (e.g., if a row of 10 connecting cubes is approximately the width of a book, skip counting down the cover of the book with the row of cubes [i.e., counting 10, 20, 30, ...] is one way to determine the area of the book cover)	– estimate, measure, and record the distance around objects, using non-standard units – estimate, measure, and record area, through investigation using a variety of non-standard units (e.g., determine the number of yellow pattern blocks it takes to cover an outlined shape)	– estimate, measure (i.e., by minimizing overlaps and gaps), and describe area, through investigation using non-standard units (e.g., “It took about 15 index cards to cover my desk, with only a little bit of space left over.”)
– estimate, measure, and record the mass of objects (e.g., apple, baseball, book), using the standard units of the kilogram and the gram	11.6	Chapter 6 Measurement, 6.9	**Mass** *Pathway 1*: Mass: Using Grams *Pathway 2*: Mass: Using Kilograms *Pathway 3*: Mass: Using Non-Standard Units	– estimate, measure, and record the mass of objects (e.g., can of apple juice, bag of oranges, bag of sand), using the standard unit of the kilogram or parts of a kilogram (e.g., half, quarter) – choose benchmarks for a kilogram and a litre to help them perform measurement tasks	– estimate, measure, and record the mass of an object, using a variety of non-standard units (e.g., “I used the pan balance and found that the stapler has the same mass as my pencil case.”)	– estimate, measure, and describe the mass of an object, through investigation using non-standard units (e.g., “My journal has the same mass as 13 pencils)

Measurement: Attributes, Units, and Measurement Sense ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– estimate, measure, and record the capacity of containers (e.g., a drinking glass, a juice box), using the standard units of the litre and the millilitre	11.7	Chapter 6 Measurement, 6.8	**Capacity** *Pathway 1*: Capacity: Using Litres *Pathway 2*: Capacity: Non-Standard Units	– estimate, measure, and record the capacity of containers (e.g., juice can, milk bag),using the standard unit of the litre or parts of a litre (e.g., half, quarter) – choose benchmarks for a kilogram and a litre to help them perform measurement tasks	– estimate, measure, and record the capacity of an object, using a variety of non-standard units	– estimate, measure, and describe the capacity of an object, through investigation using non-standard units (e.g. “The juice can has the same capacity as 4 pop cans.”)
– estimate, measure using concrete materials, and record volume, and relate volume to the space taken up by an object (e.g., use centimetre cubes to demonstrate how much space a rectangular prism takes up)	11.9, Ch. 11 Task	Chapter 3 Geometry, 3.11 with supporting TG note				
				– estimate, read (i.e., using a thermometer), and record positive temperatures to the nearest degree Celsius (i.e., using a number line; using appropriate notation) – identify benchmarks for freezing, cold, cool, warm, hot, and boiling temperatures as they relate to water and for cold, cool, warm, and hot temperatures as they relate to air (e.g., water freezes at 0°C; the air temperature on a warm day is about 20°C, but water at 20°C feels cool)	– describe how changes in temperature affect everyday experiences (e.g., the choice of clothing to wear) – use a standard thermometer to determine whether temperature is rising or falling (e.g., the temperature of water, air)	– relate temperature to experiences of the seasons (e.g., “In winter, we can skate because it’s cold enough for there to be ice.”)

Measurement: Measurement Relationships						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– describe, through investigation, the relationship between various units of length (i.e., millimetre, centimetre, decimetre, metre, kilometre)	5.1, 5.2, 5.3, 5.4, Ch. 5 Curious Math (Cutting and Measuring), 12.5, 12.6, 12.7	Chapter 9 Length, Perimeter, and Area, 9.1, 9.2, 9.3, 9.5	**Length** *Pathway 1*: Length: Standard Units *Pathway 2*: Length: Non-Standard Units	– compare standard units of length (i.e., centimetre, metre, kilometre) (e.g., centimetres are smaller than metres), and select and justify the most appropriate standard unit to measure length		– compare two or three objects using measurable attributes (e.g., length, height, width, area, temperature, mass, capacity), and describe the objects using relative terms (e.g., *taller*, *heavier*, *faster*, *bigger*, *warmer*; "If I put an eraser, a pencil, and a metre stick beside each other, I can see that the eraser is shortest and the metre stick is longest.")
– select and justify the most appropriate standard unit (i.e., millimetre, centimetre, decimetre, metre, kilometre) to measure the side lengths and perimeters of various polygons	5.1, 5.2, 5.3	Chapter 9 Length, Perimeter, and Area, 9.6, 9.7	**Length** *Pathway 1*: Length: Standard Units *Pathway 2*: Length: Non-Standard Units	– compare and order objects on the basis of linear measurements in centimetres and/or metres (e.g., compare a 3 cm object with a 5 cm object; compare a 50 cm object with a 1 m object) in problem-solving contexts		– use the metre as a benchmark for measuring length, and compare the metre with non-standard units – compare and order objects by their linear measurements, using the same non-standard unit
– determine, through investigation, the relationship between the side lengths of a rectangle and its perimeter and area	5.5, Ch. 5 Task, Ch. 8 Math Game (Area Logic), 8.4, 8.6, Ch. 8 Task	Chapter 9 Length, Perimeter, and Area, 9.13A (TG lesson)	**Length** *Pathway 1*: Length: Standard Units *Pathway 2*: Length: Non-Standard Units **Area** *Pathway 1*: Area: Using Strategies *Pathway 2*: Area: Using Whole Units	– compare and order various shapes by area, using congruent shapes (e.g., from a set of pattern blocks or Power Polygons) and grid paper for measuring		

Measurement: Measurement Relationships ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– pose and solve meaningful problems that require the ability to distinguish perimeter and area (e.g., "I need to know about area when I cover a bulletin board with construction paper. I need to know about perimeter when I make the border.")	8.1, 8.5, Ch. 8 Task	Chapter 9 Length, Perimeter, and Area, 9.11	**Length** *Pathway 1*: Length: Standard Units *Pathway 2*: Length: Non-Standard Units **Area** *Pathway 1*: Area: Using Strategies *Pathway 2*: Area: Using Whole Units	– describe, through investigation using grid paper, the relationship between the size of a unit of area and the number of units needed to cover a surface	– describe, through investigation, the relationship between the size of a unit of area and the number of units needed to cover a surface	– describe, through investigation using concrete materials, the relationship between the size of a unit and the number of units needed to measure length
– compare and order a collection of objects, using standard units of mass (i.e., gram, kilogram) and/or capacity (i.e., millilitre, litre) – determine, through investigation, the relationship between grams and kilograms	11.6	Chapter 6 Measurement, 6.8, 6.9	**Mass** *Pathway 1*: Mass: Using Grams *Pathway 2*: Mass: Using Kilograms *Pathway 3*: Mass: Using Non-Standard Units	– compare and order a collection of objects, using standard units of mass (i.e., kilogram) and/or capacity (i.e., litre)	– compare and order a collection of objects by mass and/or capacity, using non-standard units (e.g., "The coffee can holds more sand than the soup can, but the same amount as the small pail.")	
– determine, through investigation, the relationship between millilitres and litres	11.7	Chapter 6 Measurement, 6.8	**Capacity** *Pathway 1*: Capacity: Using Litres *Pathway 2*: Capacity: Non-Standard Units	– compare and order a collection of objects, using standard units of mass (i.e., kilogram) and/or capacity (i.e., litre)	– compare and order a collection of objects by mass and/or capacity, using non-standard units (e.g., "The coffee can holds more sand than the soup can, but the same amount as the small pail.")	
– select and justify the most appropriate standard unit to measure mass (i.e., milligram, gram, kilogram) and the most appropriate standard unit to measure the capacity of a container (i.e., millilitre, litre)	11.6, 11.7, 11.8	Chapter 6 Measurement, 6.8, 6.9	**Mass** *Pathway 1*: Mass: Using Grams *Pathway 2*: Mass: Using Kilograms *Pathway 3*: Mass: Using Non-Standard Units **Capacity** *Pathway 1*: Capacity: Using Litres *Pathway 2*: Capacity: Non-Standard Units	– compare and order a collection of objects, using standard units of mass (i.e., kilogram) and/or capacity (i.e., litre)	– compare and order a collection of objects by mass and/or capacity, using non-standard units (e.g., "The coffee can holds more sand than the soup can, but the same amount as the small pail.")	

Measurement: Measurement Relationships ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– solve problems involving the relationship between years and decades, and between decades and centuries	5.6	Chapter 6 Measurement, 6.1	**Time** *Pathway 1*: Reading a Clock *Pathway 2*: Time: Using Standard Units *Pathway 3*: Time: Using Non-Standard Units	– solve problems involving the relationships between minutes and hours, hours and days, days and weeks, and weeks and years, using a variety of tools (e.g., clocks, calendars, calculators)	– determine, through investigation, the relationship between days and weeks and between months and years	
– compare, using a variety of tools (e.g., geoboard, patterns blocks, dot paper), two-dimensional shapes that have the same perimeter or the same area	Ch. 5 Getting Started, Ch. 8 Mental Imagery, Ch. 8 Math Game (Area Logic), Ch. 8 Curious Math (Area on Board), 8.5, 8.6	Chapter 9 Length, Perimeter, and Area, 9.12, 9.13	**Length** *Pathway 1*: Length: Standard Units *Pathway 2*: Length: Non-Standard Units **Area** *Pathway 1*: Area: Using Strategies *Pathway 2*: Area: Using Whole Units			
Geometry and Spatial Sense: Geometric Properties						
– draw the lines of symmetry of two-dimensional shapes, through investigation using a variety of tools (e.g., Mira, grid paper) and strategies (e.g., paper folding)	Ch. 7 Curious Math (Tangram Quadrilaterals), 7.7, 7.8	Chapter 7 Transformational Geometry, 7.4			– locate the line of symmetry in a two-dimensional shape (e.g., by paper folding; by using a Mira)	– locate shapes in the environment that have symmetry, and describe the symmetry

Geometry and Spatial Sense: Geometric Properties						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– identify and compare different types of quadrilaterals (i.e., rectangle, square, trapezoid, parallelogram, rhombus) and sort and classify them by their geometric properties (e.g., sides of equal length; parallel sides; symmetry; number of right angles)	Ch. 7 Getting Started, 7.1, 7.2, Ch. 7 Curious Math (Tangram Quadrilaterals), 7.3, 7.7, 7.8, Ch. 7 Task	Chapter 3 Geometry, 3.4, 3.5, 3.6	**2-D Shapes** *Pathway 1*: Describing 2-D Shapes *Pathway 2*: Building 2-D Shapes	– identify and compare various polygons (i.e., triangles, quadrilaterals, pentagons, hexagons, heptagons, octagons) and sort them by their geometric properties (i.e., number of sides; side lengths; number of interior angles; number of right angles)	– identify and describe various polygons (i.e., triangles, quadrilaterals, pentagons, hexagons, heptagons, octagons) and sort and classify them by their geometric properties (i.e., number of sides or number of vertices), using concrete materials and pictorial representations (e.g., "I put all the figures with five or more vertices in one group, and all the figures with fewer than five vertices in another group.")	– identify and describe common two-dimensional shapes (e.g., circles, triangles, rectangles, squares) and sort and classify them by their attributes (e.g., colour; size; texture; number of sides), using concrete materials and pictorial representations (e.g., "I put all the triangles in one group. Some are long and skinny, and some are short and fat, but they all have three sides.") – trace and identify the two-dimensional faces of three-dimensional figures, using concrete models (e.g., "I can see squares on the cube.")
– identify benchmark angles (i.e., straight angle, right angle, half a right angle), using a reference tool (e.g., paper and fasteners, pattern blocks, straws), and compare other angles to these benchmarks (e.g., "The angle the door makes with the wall is smaller than a right angle but greater than half a right angle.") – relate the names of the benchmark angles to their measures in degrees (e.g., a right angle is 90º)	Ontario Supplement: Chapter 7 Lesson A: Comparing Angles, 7.5, Ch. 7 Ch. Task	Chapter 3 Geometry, 3.2, 3.3 with supporting TG note		– use a reference tool (e.g., paper corner, pattern block, carpenter's square) to identify right angles and to describe angles as greater than, equal to, or less than a right angle – compare various angles, using concrete materials and pictorial representations, and describe angles as *bigger than*, *smaller than*, or *about the same as* other angles (e.g. "Two of the angles on the red block are bigger than all the angles on the green pattern block.")		

Geometry and Spatial Sense: Geometric Properties ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– identify and describe prisms and pyramids, and classify them by their geometric properties (i.e., shape of faces, number of edges, number of vertices), using concrete materials	Ch. 11 Getting Started, 11.1, Ch. 11 Curious Math (Faces, Edges, and Vertices), 11.2, Ch. 11 Mental Imagery, 11.3, 11.5	Chapter 3 Geometry, 3.8, 3.9	**3-D Shapes** *Pathway 1*: Describing 3-D Shapes	– compare and sort prisms and pyramids geometric properties (i.e., number and shape of faces, number of edges, number of vertices), using concrete materials	– identify and describe various three-dimensional figures (i.e., cubes, prisms, pyramids) and sort and classify them by their geometric properties using concrete materials (e.g., "I separated the figures that have square faces from the ones that don't.") – distinguish between the attributes of an object that are geometric properties (e.g., number of sides, number of faces) and the attributes that are not geometric properties (e.g., colour, size, texture), using a variety of tools (e.g., attribute blocks, geometric solids, connecting cubes)	– identify and describe common three-dimensional figures (e.g., cubes, cones, cylinders, spheres, rectangular prisms) and sort and classify them by their attributes using concrete materials and pictorial representations (e.g., "I put the cones and the cylinders in the same group because they all have circles on them.") – describe similarities and differences between an everyday object and a 3-dimensional figure (e.g., "A water bottle looks like a cylinder, except the bottle gets thinner at the top.")
Geometry and Spatial Sense: Geometric Relationships						
			2-D Shapes *Pathway 1*: Describing 2-D Shapes *Pathway 2*: Building 2-D Shapes	– solve problems requiring the greatest or least number of two-dimensional shapes (e.g., pattern blocks) needed to compose a larger shape in a variety of ways (e.g., to cover an outline puzzle) – explain the relationships between different types of quadrilaterals (e.g., a square is a rectangle because a square has four sides and four right angles; a rhombus is a parallelogram because opposite sides of a rhombus are parallel)	– compose and describe pictures, designs, and patterns by combining two-dimensional shapes (e.g., "I made a picture of a flower from one hexagon and six equilateral triangles.") – compose and decompose two-dimensional shapes – cover an outline puzzle with two-dimensional shapes in more than one way	– compose patterns, pictures, and designs, using common two-dimensional shapes – identify and describe shapes within other shapes (e.g., shapes within a geometric design) – cover outline puzzles with two-dimensional shapes (e.g., pattern blocks, tangrams)

Geometry and Spatial Sense: Geometric Relationships ctd						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– construct a three-dimensional figure from a picture or model of the figure, using connecting cubes (e.g., use connecting cubes to construct a rectangular prism) – construct skeletons of three-dimensional figures, using a variety of tools (e.g., straws and modelling clay, toothpicks and marshmallows, Polydrons), and sketch the skeletons	11.3, Ch. 11 Curious Math (Making Shadows), 11.4, 11.5, 11.9, Ch. 11 Task	Chapter 3 Geometry, 3.8A (TG lesson), 3.10	**3-D Shapes** *Pathway 1*: Describing 3-D Shapes *Pathway 2*: Building 3-D Shapes	– construct rectangular prisms (e.g., using given paper nets; using Polydrons), and describe geometric properties (i.e., number and shape of faces, number of edges, number of vertices) of the prisms – identify and describe the two-dimensional shapes that can be found in a three-dimensional figure – describe and name prisms and pyramids by the shape of their base (e.g., rectangular prism, square-based pyramid)	– create models and skeletons of prisms and pyramids, using concrete materials (e.g., cardboard; straws and modelling clay), and describe their geometric properties (i.e., number and shape of faces, number of edges) – build a structure using three-dimensional figures, and describe the two-dimensional shapes and three-dimensional figures in the structure (e.g., "I used a box that looks like a triangular prism to build the roof of my house.")	– build three-dimensional structures using concrete materials, and describe the two-dimensional shapes the structures contain
– draw and describe nets of rectangular and triangular prisms – construct prisms and pyramids from given nets	Ontario Supplement: Chapter 11 Lesson A: Using Nets	Chapter 3 Geometry, 3.10A (TG lesson)				
– construct three-dimensional figures (e.g., cube, tetrahedron), using only congruent shapes	11.2	Chapter 3 Geometry, 3.8A (TG lesson)		– identify congruent two-dimensional shapes by manipulating and matching concrete materials (e.g., by translating, reflecting, or rotating pattern blocks)		

Geometry and Spatial Sense: Location and Movement						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– identify and describe the general location of an object using a grid system (e.g., "The library is located at A3 on the map.")	14.1, Ch. 14 Math Game (Grid Hide and Seek)	Chapter 7 Transformational Geometry, 7.1	**Movement and Location** *Pathway 1*: Moving on a Grid *Pathway 2*: Using Positional Language	– describe movement from one location to another using a grid map (e.g., to get from the swings to the sandbox, move three squares to the right and two squares down)	– describe the relative locations (e.g., beside, two steps to the right of) and the movements of objects on a map (e.g., "The path shows that he walked around the desk, down the aisle, and over to the window.") – draw simple maps of familiar settings, and describe the relative locations of objects on the maps	– describe the relative locations of objects or people using positional language (e.g., *over*, *under*, *above*, *below*, *in front of*, *behind*, *inside*, *outside*, *beside*, *between*, *along*) – describe the relative locations of objects on concrete maps created in the classroom
– identify, perform, and describe reflections using a variety of tools (e.g., Mira, dot paper, technology)	14.4, 14.6, Ch. 14 Task	Chapter 7 Transformational Geometry, 7.3		– identify flips, slides, and turns, through investigation using concrete materials and physical motion, and name flips, slides, and turns as reflections, translations, and rotations (e.g., a slide to the right is a translation; a turn is a rotation)		
– create and analyse symmetrical designs by reflecting a shape, or shapes, using a variety of tools (e.g., pattern blocks, Mira, geoboard, drawings), and identify the congruent shapes in the designs	14.4, 14.6, Ch. 14 Task	Chapter 7 Transformational Geometry, 7.6, Chapter 10 Patterns in Number and Geometry, 10.9		– complete and describe designs and pictures of images that have a vertical, horizontal, or diagonal line of symmetry	– create and describe symmetrical designs using a variety of tools (e.g., pattern blocks, tangrams, paper and pencil)	– create symmetrical designs and pictures, using concrete materials (e.g., pattern blocks, connecting cubes, paper for folding), and describe the relative locations of the parts

Patterning and Algebra: Patterns and Relationships						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– extend, describe, and create repeating, growing, and shrinking number patterns (e.g., "I created the pattern 1, 3, 4, 6, 7, 9, …. I started at 1, then added 2, then added 1, then added 2, then added 1, and I kept repeating this.") – connect each term in a growing or shrinking pattern with its term number (e.g., in the sequence 1, 4, 7, 10, …, the first term is 1, the second term is 4, the third term is 7, and so on), and record the patterns in a table of values that shows the term number and the term	1.2, 1.3, 1.4, Ch. 1 Math Game (Calculator Patterns), 1.5, 1.6, Ch. 1 Curious Math (Pascal's Triangle), Ch. 1 Task, 2.4, Ch. 6 Getting Started, 6.1, 6.3, Ch. 6 Curious Math (Multiplying with 9), Ch. 6 Curious Math (Circles and Digits), 9.4	Chapter 1 Number Patterns, 1.1, 1.2, 1.3, Chapter 10 Patterns in Number and Geometry 10.4, 10.5 with supporting TG note	**Patterns** *Pathway 1*: Growing and Shrinking Patterns *Pathway 2*: Repeating Patterns	– identify, extend, and create a repeating pattern involving two attributes (e.g., size, colour, orientation, number), using a variety of tools (e.g., pattern blocks, attribute blocks, drawings) – extend repeating, growing, and shrinking number patterns	– identify and describe, through investigation, growing patterns and shrinking patterns generated by the repeated addition or subtraction of 1's, 2's, 5's, 10's, and 25's on a number line and on a hundreds chart (e.g., the numbers 90, 80, 70, 60, 50, 40, 30, 20, 10 are in a straight line on a hundreds chart) – identify repeating, growing, and shrinking patterns found in real-life contexts (e.g., a geometric pattern on wallpaper, a rhythm pattern in music, a number pattern when counting dimes)	– identify, describe, and extend, through investigation, geometric repeating patterns involving one attribute (e.g., colour, size, shape, thickness, orientation) – identify and extend, through investigation, numeric repeating patterns (e.g., 1, 2, 3, 1, 2, 3, 1, 2, 3, …) – describe numeric repeating patterns in a hundreds chart – represent a given repeating pattern in a variety of ways (e.g., pictures, actions, colours, sounds, numbers, letters)
– create a number pattern involving addition, subtraction, or multiplication, given a pattern rule expressed in words (e.g., the pattern rule "start at 1 and multiply each term by 2 to get the next term" generates the sequence 1, 2, 4, 8, 16, 32, 64, …)	1.2, 1.3, 1.4, Ch. 1 Math Game (Calculator Patterns), Ch. 1 Task, 2.4, Ch. 6 Getting Started, 6.1, 6.10, 9.4	Chapter 1 Number Patterns, 1.2, Chapter 10 Patterns in Number and Geometry, 10.4, 10.5	**Patterns** *Pathway 1*: Growing and Shrinking Patterns *Pathway 2*: Repeating Patterns	– create a number pattern involving addition or subtraction, given a pattern represented on a number line or a pattern rule expressed in words	– identify, describe, and create, through investigation, growing patterns and shrinking patterns involving addition and subtraction, with and without the use of calculators (e.g., 3 + 1 = 4, 3 + 2 = 5, 3 + 3 = 6, …) – create growing or shrinking patterns	– create a repeating pattern involving one attribute (e.g., colour, size, shape, sound)

Patterning and Algebra: Patterns and Relationships ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– make predictions related to repeating geometric and numeric patterns	1.3, 1.4, 1.5, 1.6, Ch. 1 Curious Math (Pascal's Triangle)	Chapter 10 Patterns in Number and Geometry, 10.1, 10.4, 10.5	**Patterns** *Pathway 1*: Growing and Shrinking Patterns *Pathway 2*: Repeating Patterns	– identify and describe, through investigation, number patterns involving addition, subtraction, and multiplication, represented on a number line, on a calendar, and on a hundreds chart (e.g., the multiples of 9 appear diagonally in a hundreds chart)	– demonstrate, through investigation, an understanding that a pattern results from repeating an operation (e.g., addition, subtraction) or making a repeated change to an attribute (e.g., colour, orientation)	– identify a rule for a repeating pattern (e.g., "We're lining up boy, girl, boy, girl, boy, girl.")
– extend and create repeating patterns that result from reflections, through investigation using a variety of tools (e.g., pattern blocks, dynamic geometry software, dot paper)	14.4, 14.6, Ch. 14 Task	Chapter 7 Transformational Geometry, 7.6				
Patterning and Algebra: Expressions and Equality						
– determine, through investigation, the inverse relationship between multiplication and division (e.g., since 4 x 5 = 20, then 20 ÷ 5 = 4; since 35 ÷ 5 = 7, then 7 x 5 = 35)	6.3, 6.4, Ch. 6 Curious Math (Multiplying and Dividing with 0), 6.9, Ch. 6 Task, Ch. 10 Getting Started, 10.1, 10.5	Chapter 4 Multiplication and Division, 4.8, 4.9		– determine through investigation, the inverse relationship between addition and subtraction (e.g., Since 4 + 5 = 9 then 9 – 5 = 4; since 16 – 9 = 7, then 7 + 9 = 16)		

Patterning and Algebra: Expressions and Equality ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– determine the missing number in equations involving multiplication of one- and two-digit numbers, using a variety of tools and strategies (e.g., modelling with concrete materials, using guess and check with and without the aid of a calculator)	6.4	Chapter 4 Multiplication and Division, 4.6 with supporting TG note	**Equality** *Pathway 1*: Equality: Using Numbers to 100 *Pathway 2*: Equality: Using Numbers to 20	– determine the missing number in equations involving addition and subtraction of one- and two-digit numbers, using a variety of tools and strategies (e.g., modelling with concrete materials, using guess and check with and without the aid of a calculator)	– determine the missing number in equations involving addition and subtraction to 18, using a variety of tools and strategies (e.g., modelling with concrete materials, using guess and check with and without the aid of a calculator – demonstrate an understanding of the concept of equality by partitioning whole numbers to 18 in a variety of ways, using concrete materials (e.g., starting with 9 tiles and adding 6 more tiles gives the same result as starting with 10 tiles and adding 5 more tiles) – represent, through investigation with concrete materials and pictures, two number expressions that are equal, using the equal sign (e.g. "I can break a train of 10 cubes into 4 cubes and 6 cubes. I can also break 10 cubes into 7 cubes and 3 cubes. This means 4 + 6 = 7 + 3.")	– create a set in which the number of objects is greater than, less than, or equal to the number of objects in a given set – demonstrate examples of equality, through investigation, using a "balance" model – determine, through investigation using a "balance" model and whole numbers to 10, the number of identical objects that must be added or subtracted to establish equality
– identify, through investigation (e.g., by using sets of objects in arrays, by drawing area models), and use the commutative property of multiplication to facilitate computation with whole numbers (e.g., "I know that 15 x 7 x 2 equals 15 x 2 x 7. This is easier to multiply in my head because I get 30 x 7 = 210.")	6.4, 6.5, Ch. 6 Curious Math (Multiplying and Dividing with 0), Ch. 6 Task, Ch. 9 Getting Started, 9.1	Chapter 4 Multiplication and Division, 4.2		– identify, through investigation, and use the associative property of addition to facilitate computation with whole numbers (e.g., "I know that 17 + 16 equals 17 + 3 + 13. This is easier to add in my head because I get 20 + 13 = 33.") – identify, through investigation, the properties of zero and one in multiplication (i.e., any number multiplied by zero equals zero; any number multiplied by 1 equals the original number)	– identify, through investigation, and use the commutative property of addition (e.g., create a train of 10 cubes by joining 4 red cubes to 6 blue cubes, or by joining 6 blue cubes to 4 red cubes) to facilitate computation with whole numbers (e.g., "I know that 9 + 8 + 1 = 9 + 1 + 8. Adding becomes easier because that gives 10 + 8 = 18.") – identify, through investigation, the properties of zero in addition and subtraction (i.e., when you add zero to a number, the number does not change; when you subtract zero from a number, the number does not change)	

Patterning and Algebra: Expressions and Equality ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– identify, through investigation (e.g., by using sets of objects in arrays, by drawing area models), and use the distributive property of multiplication over addition to facilitate computation with whole numbers (e.g., "I know that 9 x 52 equals 9 x 50 + 9 x 2. This is easier to calculate in my head because I get 450 + 18 = 468.")	9.2, 9.3	Chapter 4 Multiplication and Division, 4.6, Chapter 10 Patterns in Number and Geometry, 10.2				
Data Management and Probability: Collection and Organization of Data						
– collect data by conducting a survey (e.g., "Choose your favourite meal from the following list: breakfast, lunch, dinner, other.") or an experiment to do with themselves, their environment, issues in their school or the community, or content from another subject, and record observations or measurements	3.2, 3.7, 3.8, 13.2, 13.3, Ch. 13 Math Game (Predicting Tiles), Ch. 13 Math Game (Choose Your Spinner), Ch. 13 Task	Chapter 5 Data Management, 5.4, 5.6, Unit 5 Problem	**Sorting and Organizing Data** *Pathway 1*: Sorting: More Than One Attribute *Pathway 2*: Sorting: One Attribute **Displaying Data** *Pathway 1*: Data: Many-to-One Correspondence *Pathway 2*: Data: One-to-One Correspondence *Pathway 3*: Concrete and Picture Graphs	– collect data by conducting a simple survey about themselves, their environment, issues in their school or community, or content from another subject	– gather data to answer a question, using a simple survey with a limited number of responses (e.g., What is your favourite season?; How many letters are in your first name?)	– demonstrate an ability to organize objects into categories by sorting and classifying objects using one attribute (e.g., colour, size), and by describing informal sorting experiences (e.g., helping to put away groceries)

Patterning and Algebra: Expressions and Equality ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– collect and organize discrete primary data and display the data in charts, tables, and graphs (including stem-and-leaf plots and double bar graphs) that have appropriate titles, labels (e.g., appropriate units marked on the axes), and scales (e.g., with appropriate increments) that suit the range and distribution of the data, using a variety of tools (e.g., graph paper, simple spreadsheets, dynamic statistical software)	3.2, 3.3, 3.6, 3.8, Ch. 3 Math Game (Race to the Top), 5.5, 8.4, 11.7, 13.2, 13.3	Chapter 5 Data Management, 5.4, 5.5, 5.6A (TG lesson), 5.6B (TG Lesson)	**Sorting and Organizing Data** *Pathway 1*: Sorting: More Than One Attribute *Pathway 2*: Sorting: One Attribute **Displaying Data** *Pathway 1*: Data: Many-to-One Correspondence *Pathway 2*: Data: One-to-One Correspondence *Pathway 3*: Concrete and Picture Graphs	– collect and organize categorical or discrete primary data and display the data in charts, tables, and graphs (including vertical and horizontal bar graphs), with appropriate titles and labels and with labels ordered appropriately along horizontal axes, as needed, using many-to-one correspondence (e.g., in a pictograph, one car sticker represents 3 cars; on a bar graph, one square represents 2 students) – demonstrate an ability to organize objects into categories, by sorting and classifying objects using two or more attributes simultaneously	– demonstrate an ability to organize objects into categories, by sorting and classifying objects using two attributes simultaneously (e.g., sort attribute blocks by colour and shape at the same time) – collect and organize primary data (e.g., data collected by the class) that is categorical or discrete (i.e., that can be counted, such as the number of students absent), and display the data using one-to-one correspondence in concrete graphs, pictographs, line plots, simple bar graphs, and other graphic organizers (e.g., tally charts, diagrams), with appropriate titles and labels and with labels ordered appropriately along horizontal axes, as needed	– collect and organize primary data (e.g., data collected by the class) that is categorical (i.e., that can be organized into categories based on qualities such as colour or hobby), and display the data using one-to-one correspondence, prepared templates of concrete graphs and pictographs (with titles and labels), and a variety of recording methods (e.g., arranging objects, placing stickers, drawing pictures, making tally marks)

Patterning and Algebra: Data Relationships						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– read, interpret, and draw conclusions from primary data (e.g., survey results, measurements, observations) and from secondary data (e.g., temperature data in the newspaper, data from the Internet about endangered species), presented in charts, tables, and graphs (including stem-and-leaf plots and double bar graphs)	Ch. 3 Getting Started, 3.1, 3.2, 3.3, Ch. 3 Curious Math (Stem-and-Leaf Plots), 3.4, 3.5, 3.6, 3.8, Ch. 3 Task, Ch. 4 Task, 5.5, 8.4, 11.7, 13.2, 13.3	Chapter 5 Data Management, 5.1, 5.2, 5.3, 5.6A (TG lesson), 5.6B (TG lesson)	**Sorting and Organizing Data** *Pathway 1*: Sorting: More Than One Attribute *Pathway 2*: Sorting: One Attribute **Displaying Data** *Pathway 1*: Data: Many-to-One Correspondence *Pathway 2*: Data: One-to-One Correspondence *Pathway 3*: Concrete and Picture Graphs	– read primary data presented in charts, tables, and graphs (including vertical and horizontal bar graphs), then describe the data using comparative language, and describe the shape of the data (e.g., "Most of the data are at the high end."; "All of the data values are different.") – interpret and draw conclusions from data presented in charts, tables, and graphs	– read primary data presented in concrete graphs, pictographs, line plots, simple bar graphs, and other graphic organizers (e.g., tally charts, diagrams), and describe the data using mathematical language (e.g., "Our bar graph shows that 4 more students walk to school than take the bus.") – pose and answer questions about class-generated data in concrete graphs, pictographs, line plots, simple bar graphs, and tally charts (e.g., Which is the least favourite season?) – distinguish between numbers that represent data values and numbers that represent the frequency of an event (e.g., "There are 10 children in my class who have 4 people in their family.") – demonstrate an understanding of data displayed in a graph (e.g., by telling a story, by drawing a picture), by comparing different parts of the data and by making statements about the data as a whole (e.g., "I looked at the graph that shows how many students were absent each month. More students were away in January than in September.")	– read primary data presented in concrete graphs and pictographs, and describe the data using comparative language (e.g., more students chose summer than winter as their single favourite season) – pose and answer questions about collected data
– demonstrate, through investigation, an understanding of median (e.g., "The median is the value in the middle of the data. If there are two middle values, you have to calculate the middle of those two values."), and deter-mine the median of a set of data (e.g., "I used a stem-and-leaf plot to help me find the median.")	Supplement: Lesson C: Median and Mode	Chapter 5 Data Management, 5.6C (TG lesson)		– demonstrate an understanding of mode (e.g., "The mode is the value that shows up most often on a graph."), and identify the mode in a set of data.		

Patterning and Algebra: Data Relationships ctd.						
Grade 4 Ontario expectations	***Nelson Mathematics 4***	***Math Makes Sense 4***	***Leaps and Bounds 3/4* Topics**	**Grade 3 Ontario expectations**	**Grade 2 Ontario expectations**	**Grade 1 Ontario expectations**
– describe the shape of a set of data across its range of values, using charts, tables, and graphs (e.g. "The data values are spread out evenly."; "The set of data bunches up around the median.")	3.2, 3.3, Ch. 3 Curious Math (Stem-and-Leaf Plots), 3.4, 3.5, 3.6, 3.8, Ch. 3 Task, 5.5, 8.4, 11.7, 13.2, 13.3	Chapter 5 Data Management, 5.6C (TG lesson), 5.6B (TG lesson)				
– compare similarities and differences between two related sets of data, using a variety of strategies (e.g., by representing the data using tally charts, stem-and-leaf plots, or double bar graphs; by determining the mode or the median; by describing the shape of a data set across its range of values)	3,2, 3.6, 5.5, 8.4, 11.7, 13.2, 13.3	Chapter 5 Data Management, 5.6A (TG lesson), 5.6B (TG lesson)				
Patterning and Algebra: Probability						
– predict the frequency of an outcome in a simple probability experiment, explaining their reasoning; conduct the experiment; and compare the result with the prediction	3.2, 3.3, 13.2, 13.3, Ch. 13 Math Game (Predicting Tiles), Ch. 13 Math Game (Choose Your Spinner), 13.4, 13.5, Ch. 13 Task	Chapter 11 Probability, 11.4, 11.5		– predict the frequency of an outcome in a simple probability experiment or game (e.g., "I predict that an even number will come up 5 times and an odd number will come up 5 times when I roll a number cube 10 times."), then perform the experiment, and compare the results with the predictions, using mathematical language	– describe the probability that an event will occur (e.g., getting heads when tossing a coin, landing on red when spinning a spinner), through investigation with simple games and probability experiments and using mathematical language (e.g., "I tossed 2 coins at the same time, to see how often I would get 2 heads. I found that getting a head and a tail was more likely than getting 2 heads.")	– describe the likelihood that everyday events will occur, using mathematical language (i.e., *impossible*, *unlikely*, *less likely*, *more likely*, *certain*) (e.g., "It's unlikely that I will win the contest shown on the cereal box.")

Patterning and Algebra: Probability ctd.						
Grade 4 Ontario expectations	Nelson Mathematics 4	Math Makes Sense 4	Leaps and Bounds 3/4 Topics	Grade 3 Ontario expectations	Grade 2 Ontario expectations	Grade 1 Ontario expectations
– determine, through investigation, how the number of repetitions of a probability experiment can affect the conclusions drawn	3.2, 3.3, 13.2, 13.3, 13.4, 13.5, Ch. 13 Task	Chapter 11 Probability, 11.5		– demonstrate, through investigation, an understanding of fairness in a game and relate this to the occurrence of equally likely outcomes	– describe probability as a measure of the likelihood that an event will occur, using mathematical language (i.e., *impossible*, *unlikely*, *less likely*, *equally likely*, *more likely*, *certain*) (e.g., "If I take a new shoe out of a box without looking, it's equally likely that I will pick the left shoe or the right shoe.")	