Ontario Ministry Sample Long Range Planner: By Question and Mathology Grade 4

Question: How are things changing?	
Time: September	
Ontario Ministry Topics and Expectations	Pearson Mathology Lessons
Place value (powers of 10), Equivalent rates (scaling), Repeating & growing patterns, Graphing patterns & data, Number relationships (whole numbers & decimal tenths), Stem & Leaf plots, Translations & reflections Number: B1.1; B1.2; B1.7; B2.3; B2.8 Algebra: C1.1; C1.2; C1.3; C1.4 Data: D1.3; D1.6 Spatial Sense: E1.3 They consider the different ways they can describe change. They look at repeating and growing patterns and use operations and pattern rules to describe change. They look at multiple-bar graphs showing how trends change over time and draw conclusions. They look at place value relationships, describe how the value of a digit changes as it shifts from one column to the next, and use this to develop mental strategies when multiplying and dividing by powers of 10. They extend their place value work with whole numbers to consider decimal tenths. They compare data presented in different ways (i.e., as multiple-bar graphs and stem and leaf plots) and describe how the presentation changes even though the amounts stay the same. They look at situations involving equivalent rates and describe how the amounts change in relation to each other. And they look at designs involving translations and reflections and describe the spatial changes involved.	Number Unit 1: Number Relationships and Place Value 1: Representing Numbers to 10 000 2: Composing and Decomposing Larger Numbers Number Unit 4: Decimals 20: Exploring Tenths Number Unit 5: Fluency with Multiplication and Division Facts 28: Whole Number Rates Number Unit 6: Multiplying and Dividing Larger Numbers 30: Exploring Strategies for Multiplying 32: Exploring Strategies for Dividing Patterning Unit 1: Patterns and Relations 1: Repeating and Growing Patterns 3: Representing Patterns Data Management and Probability Unit 1B: Data Management 3: Exploring Stem-and-Leaf Plots and Multiple-Bar Graphs Geometry Unit 2: Grids and Transformations 5: Investigating Translations

Question: How do these compare?	
Time: October	
Ontario Ministry Topics and Expectations	Pearson Mathology Lessons
Amounts to 10 000, including decimals amounts to tenths, Rounding, Fractions, decimal tenths, & whole numbers, Additive/multiplicative comparisons, Types of graphs & data, Relationships among SI prefixes, Measure mass, capacity, & length, Compare angles, Reasonableness of costs Number: B1.1; B1.2; B1.3; B1.4; B1.5; B1.6; B1.7; B1.8; B1.9 Data: D1.1; D1.2; D1.6 Spatial Sense: E2.1; E2.2; E2.4 Financial Literacy: F1.5 They build on their work with change to make comparisons involving numbers, graphs, and measurement. They compare length, mass and capacity of different objects and use units to quantify the comparisons. They compare numerical amounts using addition and subtraction (e.g., this is 200 more) as well as multiplication and division (e.g., this is twice as much). They make additive and multiplicative comparisons when describing amounts to 10 000 and decimal amounts to tenths. They compare fractions, decimals, and whole numbers on number lines and round quantities to nearby intervals. They compare prices and decide whether something is reasonably priced. They compare metric (SI) units of measurement and use multiplication and division to describe the relationships between them. They compare angles and classify them as acute, obtuse, straight, or right. They come to see that comparisons can be qualitative or quantitative, and that quantitative comparisons can involve addition-subtraction or multiplication-division.	<u>Number Unit 1: Number Relationships and Place Value</u> 3: Estimating and Rounding Numbers 5: Estimating to Solve Problems <u>Number Unit 3: Fractions</u> 13: What Are Fractions? 14: Counting by Unit Fractions 15: Exploring Different Representations of Fractions <u>Number Unit 4: Decimals</u> 22: Comparing and Ordering Decimals <u>Data Management and Probability Unit 1B: Data Management</u> 1: Qualitative and Quantitative Data 2: Collecting and Organizing Data <u>Measurement Unit 1: Length, Perimeter, and Area</u> 1: Estimating and Measuring in Millimetres 2: Measuring Length in Different Units 4: Estimating and Measuring Area in Square Metres 5: Estimating and Measuring Area in Square Centimetres <u>Measurement Unit 2: Mass and Capacity</u> 8: Investigating Mass 9: Investigating Capacity 10: Exploring Metric Prefixes ***11: Consolidation (Mass and Capacity)*** <u>Number Unit 8: Financial Literacy</u> 41: Purchasing and Making Change (Whole-Dollar Amounts)

Question: What's the story?	
Time: November	
Ontario Ministry Topics and Expectations	Pearson Mathology Lessons
Compare & describe frequencies, Select type of graph, Mean, median, mode, Tell data story (infographic), Describe likelihood, Identify & use types of data, Collect, organize, visualize data (frequency tables; stem & leaf; multiple-bar graph) Number: B1.2; B2.4; B2.6 Data: D1.1; D1.2; D1.3; D1.4; D1.5; D1.6; D2.1; D2.2 They ask questions and gather information about areas of interest. They gather qualitative and quantitative data, from both primary and secondary sources, and organize the data in a variety of ways. They select appropriate graphs and compare frequencies using additive and (approximate) multiplicative comparisons. They determine the mean, median, and mode for the data they collected and describe what each indicates. They take a point of view as they create an infographic to share their findings. They discuss whether these results would likely be replicated with a different population and, as appropriate, plot this likelihood on a probability line.	Number Unit 1: Number Relationships and Place Value 4: Comparing and Ordering Numbers ***6: Consolidation (Number Relationships and Place Value)*** Data Management and Probability Unit 1B: Data Management 4: Determining Mean, Median, and Mode 5: Analyzing Data 6: Creating Infographics ***7: Consolidation (Data Management)*** Data Management and Probability Unit 2: Probability 8: Describing Likelihood of Events 9: Predicting Outcomes of an Event 10: Conducting Experiments to Check Predictions 11: Making and Testing Predictions ***12: Consolidation (Probability)***

Question: Equal groups: How much is that?	
Time: December	
Ontario Ministry Topics and Expectations	Pearson Mathology Lessons
Count by fractions and decimal tenths, Multiplication as an array, Distributive property, Division & remainders, Math facts (×/÷), Multiplication as repeated addition of unit fractions, Solve equations, Arrays, Area of rectangles Number: B1.6; B1.7; B1.9; B2.1; B2.2; B2.5; B2.6; B2.7 Algebra: C2.1; C2.2; C2.3 Spatial Sense: E2.5; E2.6 They work with repeated equal groups to understand types of numbers and the operations of multiplication and division. They count by fractions to understand the meaning of the numerator and denominator. They count by decimal tenths to see their connection to fractions and their relationship to whole numbers. They determine the area of a rectangle by using the row and column structure of an array to organize the count of units. They connect the repeating equal groups (columns or rows) to multiplication, and use this to determine the formula for the area of a rectangle. They use the array to model the distributive property which they use to understand and recall multiplication and division facts and the relationship between the two operations. They also use the array and the distributive property to solve multiplication and division problems involving larger numbers, and they use their understanding of fractions when considering how to deal with remainders when dividing. They also recognize that any repeated group, including repeated fractional amounts, can be represented with multiplication.	Number Unit 3: Fractions 14: Counting by Unit Fractions Number Unit 4: Decimals 20: Exploring Tenths ***23: Consolidation (Decimals)*** Number Unit 5: Fluency with Multiplication and Division Facts 24: Strategies for Multiplication 25: Solving Multiplication Problems 26: Relating Multiplication and Division 27: Strategies for Division 28: Whole Number Rates ***29: Consolidation (Fluency with Multiplication and Division Facts)*** Number Unit 6: Multiplying and Dividing Larger Numbers 30: Exploring Strategies for Multiplying 31: Estimating Products 32: Exploring Strategies for Dividing 33: Estimating Quotients 34: Dividing with Remainders ***35: Consolidation (Multiplying and Dividing Larger Numbers)*** Number Unit 7: Operations with Fractions and Decimals 39: Repeated Addition with Unit Fractions Patterning Unit 2: Variables and Equations 7: Using Symbols 8: Solving Equations Concretely 11: Solving Multiplication and Division Equations 12: Using Equations to Solve Problems Measurement Unit 1: Length, Perimeter, and Area 6: Exploring the Area of Rectangles ***7: Consolidation (Length, Perimeter, and Area)***

Question: How can we describe the space around us?	
Time: January	
Ontario Ministry Topics and Expectations	Pearson Mathology Lessons
Natural & human-made patterns, Nested relationships, Solve equations, Write & alter code, Symmetries (translations & reflections), Location & movement on Cartesian plane (Q1), Measure objects, Rectangles, squares & non-rectangles, Types of angles, Area of rectangles Number: B2.1; B2.2 Algebra: C1.1; C2.1; C2.2; C3.1; C3.2 Spatial Sense: E1.1; E1.2; E1.3; E2.1; E2.2; E2.4; E2.5; E2.6 They compare, describe, identify and measure shapes, and objects in space. They identify translations and reflections in natural and human-made patterns. They translate and reflect objects, describe the actions involved, and recognize that these actions leave the object unchanged. They overlay the first quadrant of a Cartesian plane on a space and use coordinates to describe the location of an object and the movement needed to get from one location to another. They generate code, written in different ways, to describe this movement. They choose appropriate tools and metric units to estimate, measure and compare different objects. They use the formula for the area of a rectangle to find a rectangle's area or unknown side lengths, and they represent these situations with multiplication or division. They also recognize the role that rectangles play in constructing the world around them. They describe the properties of rectangles and use nested diagrams to describe relationships between rectangles, squares and non-rectangles.	<u>Patterning Unit 3: Coding</u> 14: Writing Code 15: Making Shapes 16: Coding a Shape Design ***17: Consolidation (Coding)*** <u>Geometry Unit 1B: 2-D Shapes and Angles</u> 1: Exploring Benchmark Angles 2: Properties of Rectangles 3: Investigating Polygons ***4: Consolidation (2-D Shapes and Angles)*** <u>Geometry Unit 2: Grids and Transformations</u> 5: Investigating Translations 6: Plotting and Reading Coordinates 7: Investigating Reflections ***8: Consolidation (Grids and Transformations)*** <u>Measurement Unit 1: Length, Perimeter, and Area</u> 6: Exploring the Area of Rectangles ***7: Consolidation (Length, Perimeter, and Area)***

Question: When is addition and subtraction useful?	
Time: February	
Ontario Ministry Topics and Expectations	Pearson Mathology Lessons
Represent change, combine, compare situations; add & subtract whole numbers & decimal tenths, Write & solve equations, Code (including nested), Elapsed time & timelines, Translations on Cartesian plane (Q1), Calculate costs & change Number: B2.3; B2.4 Algebra: C2.1; C2.2; C3.1; C3.2 Spatial Sense: E1.2; E2.3 Financial Literacy: F1.2 They represent and solve addition and subtraction problems where amounts are joined, separated, combined, and compared. They add and subtract whole numbers to 10 000 as well as numbers involving decimal tenths, and they use mental strategies and algorithms to solve these equations. They use addition or subtraction to calculate total costs and to determine the correct change when amounts are paid for in cash. They use addition when writing code, for example, to describe perimeter as the combined side lengths of a rectangle. They use timelines to track elapsed time, and then use addition to combine the times or subtraction to find the difference. They also notice that they can use addition and subtraction to determine distances when one point is translated to another point.	Number Unit 2: Fluency with Addition and Subtraction 7: Estimating Sums and Differences 8: Modelling Addition and Subtraction 9: Adding and Subtracting Larger Numbers 10: Using Mental Math to Add and Subtract 11: Creating and Solving Problems ***12: Consolidation (Fluency with Addition and Subtraction)*** Number Unit 7: Operations with Fractions and Decimals 36: Estimating Sums and Differences with Decimals 37: Adding and Subtracting Decimals 38: Using Mental Math to Add and Subtract Decimals ***40: Consolidation (Operations with Fractions and Decimals)*** Patterning Unit 2: Variables and Equations 9: Solving Addition and Subtraction Equations 10: Solving Addition and Subtraction Inequalities Patterning Unit 3: Coding 14: Writing Code 15: Making Shapes 16: Coding a Shape Design ***17: Consolidation (Coding)*** Measurement Unit 3: Time 12: Exploring Time 13: Telling Time in One- and Five-Minute Intervals 14: Telling Time on a 24-Hour Clock 15: Relationships Between Units of Time 16: Exploring Elapsed Time ***18: Consolidation (Time)*** Geometry Unit 2: Grids and Transformations 5: Investigating Translations 6: Plotting and Reading Coordinates 7: Investigating Reflections ***8: Consolidation (Grids and Transformations)*** Number Unit 8: Financial Literacy 41: Purchasing and Making Change (Whole-Dollar Amounts)

Question: How can we keep things in balance?	
Time: March	
Ontario Ministry Topics and Expectations	Pearson Mathology Lessons
Relationships between operations, Represent (translate) equivalent representations, Equations & variables, Mean vs median vs mode, Concepts of spending, saving, investing & donating Number: B2.1 Algebra: C1.1; C1.2; C1.3; C2.1; C2.2; C3.1; C3.2 Data: D1.5 Financial Literacy: F1.1; F1.3; F1.4 They describe ways to keep things in balance and equal. They create equivalent expressions using different operations and use these expressions to describe the relationship between the operations. They use variables to generalize these relationships and properties. They consider the concepts of spending, saving, investing and donating, and identify key factors when making decisions and keeping amounts balanced. They represent patterns in different ways and explain how the two patterns are equal. They create equivalent codes and show how nested and repeated codes can produce the same output. They also consider how mean and median describe different ways to balance data (mean as the spreading of data across the population and median as the halfway point of the data), in contrast with mode that describes the most frequent value.	Number Unit 6: Multiplying and Dividing Larger Numbers ***35: Consolidation (Multiplying and Dividing Larger Numbers)*** Patterning Unit 2: Variables and Equations 7: Using Symbols 8: Solving Equations Concretely 9: Solving Addition and Subtraction Equations 10: Solving Addition and Subtraction Inequalities 11: Solving Multiplication and Division Equations 12: Using Equations to Solve Problems ***13: Consolidation (Variables and Equations)*** Data Management and Probability Unit 1B: Data Management 3: Exploring Stem-and-Leaf Plots and Multiple-Bar Graphs Number Unit 8: Financial Literacy 43: Making Financial Decisions 44: Making Good Purchases ***45: Consolidation (Financial Literacy)***

Question: Scaling & splitting: How much now?	
Time: April	
Ontario Ministry Topics and Expectations	Pearson Mathology Lessons
Decimals as splitting, Fractions as part-whole, division, & ratios; meaning of numerator & denominator, Repeated addition of unit fraction and multiplication, Compare two sharing situations, Scale rates up & down, Reading scales on grids, graphs & measurement tools Number: B1.4; B1.5; B1.6; B1.7; B1.8; B1.9; B2.2; B2.7; B2.8 Data: D1.3 Spatial Sense: E2.2 They represent situations that involve scaling and splitting. They split a number line to show tenths and use this to describe the meaning of the denominator. They scale up to show the meaning of the numerator. They relate the splitting to division and the scaling to multiplication and use the number line to describe how fractions and decimals are related. They read scales on grids, graphs, and measurement instruments and identify the amount of each partition. They compare two equal sharing situations, each having different amounts and different numbers of people, and determine which situation produces the greater portion size. In doing so, they compare fractions and ratios, and encounter another type of multiplication and division situation. They scale rates up and down, and describe the constant multiplicative relationships that exist between the units and among equivalent ratios. They use these experiences to identify how multiplication and division can be used to scale and split amounts.	<u>Number Unit 3: Fractions</u> 16: Sharing Equally 17: Exploring Equivalence in Fractions 18: Comparing and Ordering Fractions ***19: Consolidation (Fractions)*** <u>Number Unit 7: Operations with Fractions and Decimals</u> 36: Estimating Sums and Differences with Decimals 37: Adding and Subtracting Decimals 38: Using Mental Math to Add and Subtract Decimals 39: Repeated Addition with Unit Fractions ***40: Consolidation (Operations with Fractions and Decimals*)** <u>Data Management and Probability Unit 1B: Data Management</u> 3: Exploring Stem-and-Leaf Plots and Multiple-Bar Graphs

Question: How can we make predictions and decide?	
Time: May	
Ontario Ministry Topics and Expectations	Pearson Mathology Lessons
Represent repeating & growing patterns as rules & graphs; extend, predict & justify, Probability line, Visualize & analyze data, Mean, median, mode, Financial management Number: B2.4; B2.6 Algebra: C1.1; C1.2; C1.3; C1.4 Data: D1.5; D1.6; D2.1; D2.2 Financial Literacy: F1.3; F1.4; F1.5 They use patterns and trends in data to inform decisions and make predictions. They use a probability line, and the language of likelihood to describe levels of certainty. They examine growing and repeating patterns represented concretely, as rules, and as graphs, and they use these to justify their predictions about future trends. They look at data presented in different ways, and they predict and test the likelihood that the mean, median, and mode of that data set will be similar to data collected from another population. They analyze different financial scenarios and consider factors needed to make decisions about spending and saving. They make decisions about whether something is reasonably priced and describe their rationale.	<u>Patterning Unit 1: Patterns and Relations</u> 1: Repeating and Growing Patterns 3: Representing Patterns 4: Investigating Number Relationships ***6: Consolidation (Patterns and Relations)*** <u>Data Management and Probability Unit 1B: Data Management</u> 4: Determining Mean, Median, and Mode 5: Analyzing Data <u>Data Management and Probability Unit 2: Probability</u> 8: Describing Likelihood of Events 9: Predicting Outcomes of an Event 10: Conducting Experiments to Check Predictions 11: Making and Testing Predictions ***12: Consolidation (Probability)*** <u>Number Unit 8: Financial Literacy</u> 41: Purchasing and Making Change (Whole-Dollar Amounts) 43: Making Financial Decisions 44: Making Good Purchases ***45: Consolidation (Financial Literacy)***

Question: Is this statement true?	
Time: June	
Ontario Ministry Topics and Expectations	Pearson Mathology Lessons
Number properties, Equivalent expressions, Solve equations, Solve & graph inequalities, Write, execute, & alter codes Number: B2.1 Algebra: C2.1; C2.2; C2.3; C3.1; C3.2 They analyze a variety of situations to decide whether they are true. They compare expressions, written using different operations and quantities, and demonstrate why they are or are not equivalent. They solve equations and verify their solutions. They solve and graph inequalities as they explain under what conditions the inequality is true or false. They write, execute and alter different codes and predict which ones produce the desired result.	<u>Number Unit 6: Multiplying and Dividing Larger Numbers</u> 30: Exploring Strategies for Multiplying 31: Estimating Products 32: Exploring Strategies for Dividing 33: Estimating Quotients 34: Dividing with Remainders ***35: Consolidation (Multiplying and Dividing Larger Numbers)*** <u>Patterning Unit 2: Variables and Equations</u> 7: Using Symbols 8: Solving Equations Concretely 9: Solving Addition and Subtraction Equations 10: Solving Addition and Subtraction Inequalities 11: Solving Multiplication and Division Equations 12: Using Equations to Solve Problems ***13: Consolidation (Variables and Equations)*** <u>Patterning Unit 3: Coding</u> 14: Writing Code 15: Making Shapes 16: Coding a Shape Design ***17: Consolidation (Coding)***