2016-2017 Gr. 5-8 Mathematics Continuum: Term One

We only think when we are confronted with a problem. (Keith Devlin)

The mathematical processes that support effective learning in mathematics are as follows:

Problem Solving Reasoning and Proving Reflecting Selecting Tools and Computational Strategies Connecting Representing Communicating

The mathematical processes can be seen as the processes through which students acquire and apply mathematical knowledge and skills. These processes are interconnected. Problem Solving and communicating have strong links to all the other processes.

DATES	STRANDS & TOPICS	GRADE FIVE	GRADE SIX	Grade Seven	Grade Eight
Sept. 6-Oct. 7	**NUMBER SENSE & NUMERATION** Quantity Relationships	□ read, represent, compare & order ▪ whole numbers to 100 000 □ place value: from 1 to 100 000 ▪ read and print in words whole numbers to ten thousands **ONAP – Questions 1, 2, 3**	□ read, represent, compare & order ▪ whole numbers to 1000 000 □ place value: from 1 to 1 000 000 ▪ read and print in words whole numbers to one hundred thousand □ prime & composite numbers **ONAP – Questions 1, 2, 3**	□ represent, compare and order ▪ Whole numbers ▪ Decimals to hundredths **ONAP – Questions 1, 2, 3,**	□ represent compare and order Rational numbers: positive and negative decimals to thousandths □ Exponential notation □ Represent whole numbers in expanded notation: powers of ten □ common factors and common multiples **ONAP – Questions 1, 2, 3, 4, 5**
	NUMBER SENSE & NUMERATION Counting				
	NUMBER SENSE & NUMERATION Operational Sense	□ addition and subtraction ▪ whole numbers & mental math strategies ▪ estimation to determine reasonableness **ONAP – Questions 11, 14, 15, 23**	□ addition and subtraction ▪ whole numbers &mental math strategies ▪ estimation to help judge the reasonableness of a solution **ONAP - Questions 11, 12,**	□ solve multi-step problems arising from real-life contexts and involving whole numbers and decimals (and mental math strategies) □ use estimation when solving problems involving operations with whole numbers to help judge the reasonableness of a solution □ order of operations **ONAP – Questions 6, 8, 9, 10, 11,**	□addition, subtraction, multiplication and division ▪ solve multi-step problems arising from real-life contexts and involving whole numbers and decimals (and mental math strategies) ▪ whole numbers and decimal numbers ▪ Pythagorean Relationship **ONAP – Questions 10, 11 – Performance Task 1**
Oct. 10-28	**GEOMETRY & SPATIAL SENSE** Geometric Properties	□ 2-D shapes ▪ distinguish among polygons and triangles and other 2D shapes ▪ identify, classify, measure and construct angles up to 90° ▪ identify and construct triangles according to side and angle properties **ONAP – Questions 1, 2, 3, 4 – Performance 1, 2**	□ 2-D shapes ▪ sort and classify polygons and quadrilaterals ▪ measure, classify and construct angles up to 180° ▪ construct polygons using a variety of tools **ONAP - Questions 1, 3, 4, 5, 6 – Performance 1**	□ construct related lines using angle properties and a variety of tools □ sort and classify quadrilaterals and triangles by geometric properties □ construct angle bisectors and perpendicular bisectors using a variety of tools □ investigate the angles between faces of a prism and identify right prisms □ determine the relationships among area, perimeter, corresponding angles of congruent shapes **ONAP – Questions 1, 2, 3, 4**	□ 2D shapes ▪ quadrilaterals: sort and classify by properties including diagonals ▪ constructing circles ▪ investigate and describe applications of geometric properties in the real-world **ONAP – Questions 1, 2, 3**
Oct. 31- Nov. 11	**PATTERNING & ALGEBRA** Patterns & Relationships	□ growing and shrinking patterns ▪ make predictions related to growing and shrinking patterns ▪ create, identify and extend numeric and geometric patterns ▪ table of values ▪ pattern rule ▪ addition and subtraction **ONAP - Questions 1, 2, 3 – Performance 1, 2**	□ growing and shrinking patterns ▪ relationships ▪ table of values, pattern rules or graphs ▪ determine term & term numbers ▪ describe the pattern rule in words using addition, subtraction, multiplication & division **ONAP – Questions 1, 2, 3, 4 – Performance Task 1, 2**	□ linear growing patterns ▪ relationships ▪ table of values ▪ plot coordinates on a graph ▪ write a pattern rule using words ▪ algebraic expression **ONAP – Questions 1, 2, 3, 4 – Performance Task 1**	□ linear growing patterns ▪ table of values ▪ concrete materials, graphs and algebraic expressions ▪ represent through investigation the general term of a linear pattern using one or more algebraic expressions ▪ determine a term given its term number in a linear pattern represented by a graph or algebraic equation **ONAP – Questions 1, 2, 3 – Performance Task 1 and 2**
Nov. 14-Dec.2	**DATA MANAGEMENT & PROBABILITY** Collection & Organization of Data	□ collect, organize data using surveys and experiments □ distinguish between discrete and continuous data □ charts and graphs including broken-line graphs ▪ stem and leaf plots **ONAP – Questions 1, 2 – Performance Task 1**	□ surveys and experiments □ discrete and continuous data □ select and justify appropriate graphs to represent data (From types of graphs already studied, such as pictographs, horizontal or vertical bar graphs, stem and leaf plots, double bar graphs, broken line graphs, and continuous line graphs) □ bias □ inferences ▪ compare different graphical representation of the same data **ONAP – Questions 1, 2, 3, 4, 5 Performance Task 1**	□ surveys and experiments □ discrete and continuous data □ select and justify appropriate graphs to represent data (From types of graphs already studied, such as pictographs, horizontal or vertical bar graphs, stem and leaf plots, double bar graphs, broken line graphs, and continuous line graphs) □ bias □ inferences **ONAP – Questions 1, 2, 3, 4 – Performance Task 1**	□ surveys and experiments related to students □ categorical, discrete and continuous primary and secondary data □ organize sets of data into intervals that spread over a broad range □ select and justify appropriate graphs to represent data □ charts and graphs including relative frequency tables with intervals, histograms, and scatter plots □relationship between census, a representative sample, sample size and a population **ONAP – Questions 1, 2, 3, 4, 5**
	DATA MANAGEMENT & PROBABILITY Data Relationships	□ read, interpret & draw conclusions from primary & secondary data ▪ sets of data can be samples of larger populations □ mean □ comparing related sets of data **ONAP – Questions 3, 4, 5, 6**	□ read, interpret & draw conclusions from primary & secondary data □ review mean, median, mode and range □ relationships between sets of data □ use of scale **ONAP – Questions 6, 7, 8**	□ read, interpret & draw conclusions from primary and secondary data □ mean, median, mode □ examination of data presented in misleading ways □ trends **ONAP – Questions 5, 6, 7, 8, 9**	□ read, interpret & draw conclusions from primary and secondary data □ central tendency: mean, median, mode □ trends and relationships □ making inferences and convincing arguments □ comparing two attributes using scatter plots **ONAP – Questions 6, 7, 8, 9, 10 – Performance Task 1**
Dec. 5-23 Ongoing with Number Talks	**NUMBER SENSE & NUMERATION** Operational Sense	□ multiplication ▪ 2-digit by 2-digit whole numbers using estimation, mental math strategies, student generated algorithms and standard algorithms □ division ▪ 3-digit by 1-digit whole numbers using concrete materials, estimation, student generated algorithms and standard algorithms **ONAP – Questions 18, 19, 20, 21, 22 - Performance Task 1 and 2**	□ multiplication ▪ 4-digit by 2-digit whole numbers □ division ▪ 4-digit by 2-digit whole numbers □ standard order of operations **ONAP – Questions 11, 13, 14, 15, 16 – Performance 2**		
	NUMBER SENSE & NUMERATION Quantity Relationships			□ identify, compare, represent, and order integers □ represent perfect squares and square roots, using a variety of tools □ explain the relationship between exponential notation and the measurement of area and volume	□ percent to one decimal place ▪ Solve problems involving percent that arise from real-life contexts □square roots of whole numbers ▪ estimate and verify using a calculator the square root of whole numbers ▪ distinguish between whole numbers that have whole number square roots and those that do not □ multi-step problems **ONAP – Questions 6, 7 – Performance Task 1**
Jan. 9-Feb. 3	**MEASUREMENT** Attributes, Units & Measurement Sense	□ length ▪ mm, cm, dm, m, km □ estimate and measure the perimeter and area regular and irregular polygons **ONAP – Questions 1, 2, 5**	□ length & area ▪ estimate &measure with metric system ▪ select and justify the appropriate metric unit □ justify appropriateness of times to estimate and times to make precise measurements **ONAP – Questions 1, 2, 4**	□ sketch polygonal prisms **ONAP – Questions 1, 2**	
	MEASUREMENT Measurement Relationships	□ length, height, width & distance ▪ conversions: m to cm, km to m ▪ select and justify the most appropriate standard unit (mm, cm, dm, m, km) to measure length, height, width and distance and to measure the perimeter of various polygons □ perimeter and area ▪ determine the relationship between the length and width of a rectangle and its perimeter and area ▪ generalize the formula of a rectangle ▪ solve problems requiring the estimation of perimeters and areas of rectangles **ONAP – Questions: 9, 10, 11, 12, 18 – Performance Task 1, 2**	□ length, height, width & distance ▪ conversions from larger to smaller metric units □ construct a rectangle, square, triangle & parallelogram using tools □ composing & decomposing ▪ relationship between area of a rectangle & the areas of parallelograms & triangles □ develop the formula for the areas of a parallelogram & triangle **ONAP – Questions 5, 6, 8**	□ conversions between metric units of measure and metric units of area □ perimeter and area formula of a trapezoid estimate and calculate the area of composite two-dimensional shapes **ONAP – Questions 4, 5, 6, 7, 8, 9 – Performance Task1**	□ conversions ▪ metric units of area: square centimeters and square metres ▪ solve problems that require conversions □ circle ▪ measure circumference, radius, diameter ▪ formula for circumference ▪ area formula ▪ relationships for calculating the circumference and the area of a circle and generalize to develop the formula ▪ solve problems involving estimation and calculation of circumference and area of a circle **ONAP – Questions 2, 3, 4, 5, 6, 7, 8, 9, 10 – Performance Task 2**

2016-2017 Gr. 5-8 Mathematics Continuum: Term Two

DATES	STRANDS & TOPICS	GRADE FIVE	GRADE SIX	Grade Seven	Grade Eight
Feb. 6-10	**GEOMETRY & SPATIAL SENSE** Location & Movement	□ cardinal directions □ compare grid systems commonly used in maps □ identify, perform and describe translations ▪ create and analyze designs by translating and/or reflecting shapes ▪ 2D shapes **ONAP – Questions 11, 12, 13**	□ coordinate system: Cartesian coordinate plane □ rotations, reflections & translations ▪ Create and analyze designs ▪ centre of rotation inside or outside the shape ▪ 90° & 180° rotations **ONAP – Questions 9, 10, 11, 12 – Performance 2**	□ plot points using all four quadrants of the Cartesian coordinate plane □identify, perform, and describe dilatations □ create and analyze designs involving translations, reflections, dilatations, and/or simple rotations of two-dimensional shapes □ determine, through investigation polygons or combinations of polygons that tile a plane, and describe the transformation(s) involved **ONAP – Questions 7, 8, 9 – Performance Task 1**	□ Cartesian co-ordinate plane: plotting a point after a transformation □ transformations: real world movements **ONAP – Questions 9, 10, 11, 12 – Performance Task 1**
Feb. 13-March 2	**PATTERNING & ALGEBRA** Patterns & Relationships	□ repeating translation patterns □ growing and shrinking patterns ▪ Table of values ▪ Multiplication and division **ONAP – Questions 3, 4, 5**	□ repeating rotation patterns □ geometric patterns **ONAP – Questions 5**	□ develop and represent the general term of a linear growing pattern using algebraic expressions **ONAP – Questions 5, 6**	□ determine a term, given its term number, in a linear pattern that is represented by a graph or an algebraic equation **ONAP – Questions 4**
	PATTERNING & ALGEBRA Grade 4-6 Variables, Expressions & Equations	□ variables ▪ as a changing or unknown quantities □ missing numbers in equations ▪ addition, subtraction, multiplication and division **ONAP – Questions 6, 7, 8, 9**	□ variables ▪ as a changing quantity ▪ as an unknown quantity □ 2 or 3 symbols or letters as variables ▪ solve simple equations through investigation **ONAP – Questions 6, 7, 8**	□ model real-life relationships involving constant rates □ translate phrases describing simple mathematical relationships into algebraic expressions □ evaluate algebraic expressions by substituting natural numbers for the variables □ solve linear equations **ONAP – Questions 7, 8, 9, 10 – Performance Task 2**	□ algebra: real-life situations □ linear and relationships: model graphically and algebraically □ solve and verify algebraic equations: balance model ▪ evaluate algebraic expressions with up to three terms by substituting fractions, decimals or integers for variables **ONAP – Questions – 5, 6, 7, 8, 9, 10**
Mar. 6-31 ongoing with Number Talks	**NUMBER SENSE & NUMERATION** Quantity Relationships	□ read, represent, order and compare fractions ▪ proper, improper fractions and mixed numbers ▪ like denominators ▪ round decimal numbers to the nearest tenth □ represent, order & compare decimals to the hundredths □ demonstrate and explain ▪ equivalent fractions ▪ equivalent decimal numbers □ place value of decimal numbers to the hundredth □ read and write money amounts to $1000 □ addition and subtraction of decimal numbers to hundredths □ multiply decimal numbers by 10, 100, 1000, 10 000 **ONAP – Questions 4, 5, 6, 7, 8, 9, 10, 16, 17,**	□ represent, order & compare fractions ▪ proper, improper & mixed numbers ▪ unlike denominators □ represent, order & compare decimals to the thousandths □ benchmarks of percents: 10%, 25%, 50%, 75% & 100% □ place value of decimal numbers to the thousandths □ multiply and divide decimal numbers to the ▪ decimal numbers to tenths □ addition and subtraction of decimal numbers to thousandths □ multiply and divide decimal numbers by 10, 100, 1000, 10 000 □ multiply whole numbers by 0.1, 0.01, and 0.001 **ONAP – Questions 4, 5, 6, 7, 8, 9 – Performance 1**	□ represent, order & compare decimals to the hundredths and fractions □ select and justify the most appropriate representation of quantity **ONAP – Questions 1, 4 – Performance Task 1 and 2**	□ represent, order and compare ▪ rational numbers: positive and negative fractions to thousandths □ translate between equivalent forms of a number ▪ decimals, fractions and percents **ONAP – Questions**
	NUMBER SENSE & NUMERATION: Counting	□ count forward by hundredths from any **decimal** number expressed to two decimal places, using concrete materials and number line **ONAP – Questions 12, 13**			
	NUMBER SENSE & NUMERATION Operational Sense			□ divide whole numbers by simple fractions and by decimal numbers to hundredths □use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals □ solve problems involving multiplication and division of decimal numbers to thousandths by one digit whole numbers □ use estimation when solving problems involving operations with whole numbers, decimals and percents to help judge the reasonableness of a solution □order of operations □ add and subtract fractions with like and unlike denominators using a variety of tools □ add and subtract integers using a variety of tools **ONAP – Questions 8, 9, 11, 12, 13, 15**	□ integers ▪ addition, subtraction, multiplication and division □ order of operations in expressions with brackets and exponents □ fractions ▪ addition, subtraction, multiplication and division with simple fractions ▪ represent multiplication and division of fractions, integers □ decimals ▪ multiply and divide decimals to various powers of ten □ use estimation when solving problems with whole numbers, decimals, percent, integers an d fractions to help judge the reasonableness of a solution **ONAP – Questions 8, 9, 10, 11, 12, 13, 14, 15, 16 – Performance Task 2**
	NUMBER SENSE & NUMERATION Proportional Relationships	□ fractions ▪ multiplicative relationships ▪ relationships between fractions & decimals □ whole-number rates **ONAP – Questions 24, 25, 26**	□ represent ratio □ determine and explain the relationship among fractions, decimals and percents □ represent relationships using unit rates **ONAP – Questions 17, 18, 19**	□ demonstrate an understanding of rate as a comparison of ratio, or of two measurements of different units □ solve problems involving the calculation of unit rates **ONAP – Questions 16, 17, 18**	□ percent, ratio and unit rate ▪ solve problems involving percent and rate in real-life situations □ identify and describe real-life situations involving two quantities that are directly proportional **ONAP – Questions 17, 18, 19, 20**
Apr. 3-14	**DATA MANAGEMENT & PROBABILITY** Probability	□ determine and represent all possible outcomes in a simple probability experiment □ represent the probability that an event will occur using a common fraction □ pose and solve simple probability problems **ONAP – Questions 7, 8 Performance Task 2**	□ theoretical probability as a ratio probability of an event from 0 to 1 □ represent the probability of an event □ predict the frequency of an outcome of a simple probability experiment or game **ONAP – Questions 9, 10, 11 – Performance Task 2**	□ research and report on real-world applications of probabilities expressed in fraction, decimal, and percent form □make predictions about a population when given a probability □ represent in a variety of ways all the possible outcomes of a probability experiment involving two independent events □ perform a simple probability experiment involving two independent events, and compare the experimental probability with the theoretical probability of a specific outcome **ONAP – Questions 10, 11, 12 – Performance Task 2**	□ experimental vs theoretical ▪ two independent events ▪ complementary events **ONAP – Questions 11, 12, 13, 14 – Performance Task 2**
Apr. 17-May 19	**MEASUREMENT** Attributes, Units & Measurement Sense	□ time ▪ estimate, measure and represent time to the nearest second ▪ estimate and determine elapsed time expressed in minutes, hours, days, weeks, months, or years □ temperature • Measure and record temperature to determine and represent changes over time **ONAP – Questions 3, 4, 17**	**ONAP** – Questions 1, 2 - Performance Task 1	□ Research and report on a real life application of area measurement **ONAP – Questions 1, 2, 3**	□ research, describe and report on applications of volume and capacity □ research and report on a real life application of area measurement **ONAP – Questions 1 – Performance Task 1**
	MEASUREMENT Measurement Relationships	□ 12-hour vs. 24-hour clock ▪ solve problems involving the relationship between a 12-hour and a 24-hour clock □ generalize to develop the formula of the volume of a rectangular prism □ relationship between volume and capacity □ mass ▪ mg, g, kg, tonne **ONAP – Questions 6, 7, 8, 13, 14, 15, 16 - Performance Task 2**	□ mass, capacity & volume (metric system) ▪ conversions from large to small units □ volume ▪ develop the formula of a triangular prism □ estimation and calculation of the surface area of rectangular & triangular prism **ONAP – Questions 11, 12, 13 Performance 2**	□ Generalize to develop the formula of the volume of a right prism **ONAP – Questions 10, 12** □ surface area of right prisms □ solve problems that involve the surface area and volume of right prisms and that require conversion between metric measures of capacity and volume (Science Connection) **ONAP – Questions 10, 11, 12 – Performance Task 2**	
May 22-June 29	**GEOMETRY & SPATIAL SENSE** Geometric Properties	□ 3-D figures ▪ distinguish among prisms, right prisms, pyramids and other 3D figures ▪ identify prisms and pyramids from their nets **ONAP – Questions 5**	□ angles up to 180° **ONAP – Questions 3, 4, 5, 6**		3D figures ▪ geometric properties: Real life situations □ Polyhedron: faces, edges and vertices **ONAP – Questions 4**
	GEOMETRY & SPATIAL SENSE Geometric Relationships	□ 3-D figures ▪ identify prisms and pyramids from their nets ▪ construct nets of prisms and pyramids **ONAP – Questions 6, 7, 8, 9, 10**	□ 3-D figures ▪ models ▪ sketches using isometric dot paper & dynamic geometry software **ONAP – Questions 7, 8**	• sketch three-dimensional figures and construct three-dimensional figures from drawings **ONAP – Questions 5, 6 – Performance Task 2**	□ measurement relationships: similar shapes □ angle relationships: parallel and intersecting lines □ Pythagorean Relationship (reviewed) **ONAP – Questions 5, 6, 7, 8 – Performance Task 2**