



Mathematics Curriculum Map Grades K – 12

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Introduction

Mission Statement

Abbotsford Christian School, operated by Abbotsford Christian School Society members, seeks to serve Christian families by providing a secure learning environment in which God's children can continue to explore, experience and evaluate all of life under God.

We aim to nurture students in the discovery and development of their abilities and unique gifts so that they are enabled to be faithful, discerning, obedient and creative servants of God and of neighbour; and stewards of His creation.

Enduring Understandings

The study of Mathematics is one way in which we see the beauty, order, relationships and design of God's creation. Through seeing patterns in creation, and developing quantitative and spatial awareness, students will grow in their ability to discover and interact with God's world. They will learn to use numbers honestly and accurately to describe aspects of life and make sense of human experiences. They will learn to assess the incomplete nature of human understanding of creation and to base their own interpretations on God's faithfulness in upholding the world.

Symbols and formulas of Math are human inventions derived from people's experiences and explorations in God's world throughout history. Mathematics provides important opportunities for students to learn and apply reasoning, deductive, and problem solving skills that are useful in daily life. Math is not merely about finding correct answers, but also about exploring possible solutions to many problems.

Goals:

1. To enjoy and value the intricacies of number, patterns, and geometry as God's gifts to people.
2. To understand that Mathematics is one way to comprehend the inter-connectedness of God's creation and is to be used for his service.
3. To nurture positive attitudes (including confidence and risk-taking) towards Mathematics.
4. To develop an understanding and competency in mathematical skills and concepts and in problem solving.
5. To make mathematical concepts relevant to everyday life/potential careers/other disciplines.
6. To explore and understand the limits of Mathematics and how it can be misused and harmful.
7. To recognize our role as God's agents to bring healing when mathematics has been misused.

Essential Questions

How does order in creation reflect God's faithfulness?

Why is Math important?

How did Math as a discipline develop?

How is Math used in our world?

What are the limits of Math?

How can Math be misused?

How should we use Math to serve God in the world around us?

Math Curriculum Map Grades K – 12

Planning for Assessment (Teaching Strategies), Assessment Indicators (Assessment Activities) and resources are listed in course overviews

Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will: A. Number, B. Pattern and Relations, C. Shape and Space, D. Statistics and Probability (categories for K – 9)	Cross Curricular Connections
K	<ul style="list-style-type: none"> How does order in creation reflect God's faithfulness? Why is Math important? How did Math as a discipline develop? How is Math used in our world? What are the limits of Math? How can Math be misused? How should we use Math to serve God in the world around us? 	<p>Number</p> <ul style="list-style-type: none"> Number sequence to 10 Familiar number arrangements up to 5 objects One-to-one correspondence Numbers in-depth to 10 <p>Patterns and Relations – Patterns</p> <ul style="list-style-type: none"> Repeating patterns of two or three elements <p>Patterns and Relations – Variables and Equations</p> <ul style="list-style-type: none"> N/A <p>Shape and Space – Measurement</p> <ul style="list-style-type: none"> Direct comparison for length, mass & volume <p>Shape and Space – 3-D objects and 2-D Shapes</p> <ul style="list-style-type: none"> Single attribute of 3-D objects <p>Shape and Space – Transformations</p> <ul style="list-style-type: none"> N/A <p>Statistics and Probability – Data Analysis</p> <ul style="list-style-type: none"> N/A <p>Statistics and Probability – Chance and Uncertainty</p> <ul style="list-style-type: none"> N/A 	<p>A1 say the number sequence by 1s starting anywhere from 1 to 10 and from 10 to 1 [C, CN, V]</p> <p>A2 recognize, at a glance, and name familiar arrangements of 1 to 5 objects or dots [C, CN, ME, V]</p> <p>A3 relate a numeral, 1 to 10, to its respective quantity [CN, R, V]</p> <p>A4 represent and describe numbers 2 to 10, concretely and pictorially [C, CN, ME, R, V]</p> <p>A5 compare quantities, 1 to 10, using one-to-one correspondence [C, CN, V]</p> <p>B1 demonstrate an understanding of repeating patterns (two or three elements) by</p> <ul style="list-style-type: none"> identifying reproducing extending creating <p>patterns using manipulatives, sounds, and actions [C, CN, PS, V]</p> <p>C1 use direct comparison to compare two objects based on a single attribute such as length (height), mass (weight), and volume (capacity) (C,CN,PS,R,V)</p> <p>C2 sort 3-D objects using a single attribute (C,CN,PS,R,V)</p> <p>C3 build and describe 3-D objects (CN, PS, V)</p>	<p>Theme:</p> <ul style="list-style-type: none"> Rainforest—creating animals from basic shapes Apples—creating concentric apples with lines Transportations—tallying kinds of vehicles on Clayburn Road in front of the school Bedtime/Night-time: leaning about time and the clock Nursery Rhymes: Rhythm and beats and counting beats All themes: Graphing and data analysis <p>Art:</p> <ul style="list-style-type: none"> Geometric shape art

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1	<ul style="list-style-type: none"> How does order in creation reflect God's faithfulness? Why is Math important? How did Math as a discipline develop? How is Math used in our world? What are the limits of Math? How can Math be misused? How should we use Math to serve God in the world around us? 	<p>Number</p> <ul style="list-style-type: none"> skip counting starting at 0 to 100 arrangements up to 10 objects numbers in-depth to 20 additions & subtraction to 20 mental math strategies to 18 <p>Patterns and Relations – Patterns</p> <ul style="list-style-type: none"> repeating patterns of two to four elements representation of pattern <p>Patterns and Relations – Variables and Equations</p> <ul style="list-style-type: none"> equalities and inequalities symbol for equality <p>Shape and Space – Measurement</p> <ul style="list-style-type: none"> process of measurement using comparison <p>Shape and Space – 3-D Objects and 2-D Shapes</p> <ul style="list-style-type: none"> one attribute of 3-D objects and 2-D shapes composite 2-D shapes and 3-D objects 2-D shapes in the environment <p>Shape and Space – Transformations</p> <ul style="list-style-type: none"> N/A <p>Statistics and Probability – Data Analysis</p> <ul style="list-style-type: none"> N/A <p>Statistics and Probability – Chance and Uncertainty</p> <ul style="list-style-type: none"> N/A 	<p>A1 say the number sequence, 0 to 100, by</p> <ul style="list-style-type: none"> 1s forward and backward between any two given numbers 2s to 20, forward starting at 0 5s and 10s to 100, forward starting at 0 [C, CN, V, ME] <p>A2 recognize, at a glance, and name familiar arrangements of 1 to 10 objects or dots [C, CN, ME, V]</p> <p>A3 demonstrate an understanding of counting by</p> <ul style="list-style-type: none"> indicating that the last number said identifies "how many" showing that any set has only one count using the counting on strategy using parts or equal groups to count sets [C, CN, ME, R, V] <p>A4 represent and describe numbers to 20 concretely, pictorially, and symbolically [C, CN, V]</p> <p>A5 compare sets containing up to 20 elements to solve problems using</p> <ul style="list-style-type: none"> referents one-to-one correspondence [C, CN, ME, PS, R, V] <p>A6 estimate quantities to 20 by using referents [C, ME, PS, R, V]</p> <p>A7 demonstrate, concretely and pictorially, how a given number can be represented by a variety of equal groups with and without singles [C, R, V]</p> <p>A8 identify the number, up to 20, that is one more, two more, one less, and two less than a given number. [C, CN, ME, R, V]</p> <p>A9 demonstrate an understanding of addition of numbers with answers to 20 and their corresponding subtraction facts, concretely, pictorially, and symbolically by</p> <ul style="list-style-type: none"> using familiar and mathematical language to describe additive and subtractive actions from their experience creating and solving problems in context that involve addition and subtraction modelling addition and subtraction using a variety of concrete and visual representations, recording the process symbolically [C, CN, ME, PS, R, V] <p>A10 describe and use mental mathematics strategies (memorization not intended), such as</p> <ul style="list-style-type: none"> counting on and counting back making 10 	<ul style="list-style-type: none"> Fall/Pumpkin Unit: Pumpkin Math—estimation, weighing, counting Community Helpers Unit: Classroom Store—counting coins, making change Hundreds Day activities Story problems relating to various themes Bible—the creation story—patterns in the environment Art—Matisse and Mondrian art projects—patterns and relations Art—African Kente cloth—patterns and relations

			<ul style="list-style-type: none"> doubles using addition to subtract to determine the basic addition facts to 18 and related subtraction facts [C, CN, ME, PS, R, V] <p>B1 demonstrate an understanding of repeating patterns (two to four elements) by</p> <ul style="list-style-type: none"> describing reproducing extending creating patterns using manipulatives, diagrams, sounds, and actions [C, PS, R, V] <p>B2 translate repeating patterns from one representation to another [C, R, V]</p> <p>B3 describe equality as a balance and inequality as an imbalance, concretely, and pictorially (0-20) [C, CN, R, V]</p> <p>B4 record equalities using the equal symbol [C, CN, PS, V]</p> <p>C1 demonstrate an understanding of measurement as a process of comparing by</p> <ul style="list-style-type: none"> identifying attributes that can be compared ordering objects making statements of comparison filling, covering, or matching [C, CN, PS, R, V] <p>C2 sort 3-D objects and 2-D shapes using one attribute, and explain the sorting rule [C, CN, R, V]</p> <p>C3 replicate composite 2-D shapes and 3-D objects [CN, PS, V]</p> <p>C4 compare 2-D shapes to parts of 3-D objects in the environment [C, CN, V]</p>	
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Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will: A. Number, B. Pattern and Relations, C. Shape and Space, D. Statistics and Probability (categories for K – 9)	Cross Curricular Connections
2	<ul style="list-style-type: none"> How does order in creation reflect God's faithfulness? Why is Math important? How did Math as a discipline develop? How is Math used in our world? What are the limits of Math? How can Math be misused? How should we use Math to serve God in the world around us? 	<p>Number</p> <ul style="list-style-type: none"> skip counting at starting points other than 0 to 100 numbers in-depth to 100 even, odd and ordinal numbers addition and subtraction to 100 mental math strategies to 18 <p>Patterns and Relations – Patterns</p> <ul style="list-style-type: none"> repeating patterns of three to five elements increasing patterns <p>Patterns and Relations – Variables and Equations</p> <ul style="list-style-type: none"> equality and inequality symbols for equality and inequality <p>Shape and Space – Measurement</p> <ul style="list-style-type: none"> days, weeks, months, and years non-standard units of measure for length, height, distance around, mass (weight) <p>Shape and Space – 3-D Objects and 2-D Shapes</p> <ul style="list-style-type: none"> two attributes of 3-D objects and 2-D shapes cubes, spheres, cones, cylinders, pyramids triangles, squares, rectangles, circles 2-D shapes in the environment <p>Shape and Space – Transformations</p> <ul style="list-style-type: none"> N/A <p>Statistics and Probability – Data Analysis</p> <ul style="list-style-type: none"> Data about self and others Concrete graphs and pictographs <p>Statistics and Probability – Chance and Uncertainty</p> <ul style="list-style-type: none"> N/A 	<p>A1 say the number sequence from 0 – 100 by</p> <ul style="list-style-type: none"> 2s, 5s and 10s, forward and backward, using starting points that are multiples of 2, 5, and 10 respectively 10s using starting points from 1 – 9 2s starting from 1 [C, CN, ME, R,] <p>A2 demonstrate if a number (up to 100) is even or odd [C, CN, PS, R,]</p> <p>A3 describe order or relative position using ordinal numbers (up to tenth) [C, CN, R]</p> <p>A4 represent and describe numbers to 100, concretely, pictorially, and symbolically [C, CN, V]</p> <p>A5 compare and order numbers up to 100 [C, CN, R, V]</p> <p>A7 illustrate, concretely and pictorially, the meaning of place value for numerals to 100 [C, CN, R, V]</p> <p>A8 demonstrate and explain the effect of adding zero to or subtracting zero from any number [C,R]</p> <p>A9 demonstrate an understanding of addition (limited to 1 and 2-digit numerals) with answers to 100 and the corresponding subtraction by</p> <ul style="list-style-type: none"> Using personal strategies for adding and subtracting with and without the support of manipulatives Creating and solving problems that involve addition and subtraction Explaining that the order in which numbers are added does not affect the sum Explaining that the order in which numbers are subtracted may affect the difference [C, CN, ME, PS, R, V] <p>A10 apply mental mathematics strategies, such as</p> <ul style="list-style-type: none"> Using doubles Making 10 One more, one less Two more, two less Building on a known double Addition for subtraction to determine basic addition facts to 18 and related subtraction facts [C, CN, ME, R, V] <p>B1 demonstrate an understanding of repeating patterns (three to five elements) by</p> <ul style="list-style-type: none"> Describing Extending Comparing Creating Patterns using manipulatives, diagrams, sounds, and actions [C, CN, PS, R, V] <p>B2 demonstrate an understanding of increasing patterns by</p> <ul style="list-style-type: none"> Describing Extending 	<p>Theme:</p> <ul style="list-style-type: none"> Birds—tally the number of different kinds of birds at the Blue Heron Nature Reserve Matter <ul style="list-style-type: none"> -estimation, e.g. How many pennies will it take to make the liquid overflow in the cup? -number concepts—number of particles in solids, liquids, gases <p>PE:</p> <ul style="list-style-type: none"> number concepts—keeping score, dividing into teams <p>Art:</p> <ul style="list-style-type: none"> projects using 2D and 3D shapes

- Comparing
- Creating

Patterns using manipulatives, diagrams, sounds, and actions [C, CN, PS, R, V]

B3 demonstrate and explain the meaning of equality and inequality by using manipulatives and diagrams (0 to 100) [C, CN, R, V]

B4 record equalities and inequalities symbolically using the equal symbol or the not equal symbol [C, CN, R, V]

C1 relate the number of days to a week and the number of months to a year in a problem-solving context [C, CN, PS, R]

C2 relate the size of a unit of measure to the number of units (limited to non-standard units) used to measure length and mass (weight) [C, CN, ME, R, V]

C3 compare and order objects by length, height, distance around, and mass (weight) using non-standard units, and make statements of comparison [C, CN, ME, R, V]

C4 measure length to the nearest non-standard unit by

- Using multiple copies of a unit
- Using a single cope of a unit (iteration process) [C, ME, R, V]

C5 demonstrate that changing the orientation of an object does not alter the measurements of its attributes [C, R, V]

C6 sort 2-D shapes and 3-D objects using two attributes and explain the sorting rule [C, CN, R, V]

C7 describe, compare, and construct 3-D objects, including

- Cubes
- Spheres
- Cones
- Cylinders
- Pyramids [C, CN, R, V]

C8 describe, compare, and construct 2-D shapes, including

- Triangles
- Squares
- Rectangles
- Circles [C, CN, R, V]

C9 identify 2-d shapes as parts of 3-D objects in the environment [C, CN, R, V]

D1 gather and record data about self and others to answer questions [C, CN, PS, V]

D2 construct and interpret concrete graphs and pictographs to solve problems [C, CN, PS, R, V]

Math Curriculum Map Grades 3 - 5

Planning for Assessment (Teaching Strategies), Assessment Indicators (Assessment Activities) and resources are listed in course overviews

Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will: A. Number, B. Pattern and Relations, C. Shape and Space, D. Statistics and Probability (categories for K – 9)	Cross Curricular Connections
3	<ul style="list-style-type: none"> How does order in creation reflect God's faithfulness? Why is Math important? How did Math as a discipline develop? How is Math used in our world? What are the limits of Math? How can Math be misused? How should we use Math to serve God in the world around us? 	<p>Number</p> <ul style="list-style-type: none"> Skip counting at starting points other than 0 to 1000 Numbers in-depth to 1000 Addition and subtraction to 1000 Mental math strategies for 2-digit numerals Multiplication up to 5 times 5 Representation of fractions <p>Patterns and Relations – Patterns</p> <ul style="list-style-type: none"> Increasing patterns Decreasing patterns <p>Patterns and Relations – Variables and Equations</p> <ul style="list-style-type: none"> One-step addition and subtraction equations <p>Shape and Space – Measurement</p> <ul style="list-style-type: none"> Non-standard and standard units of time Measurements of length (cm, m) and mass (g, kg) Perimeter of regular and irregular shapes <p>Shape and Space – 3-D Objects and 2-D Shapes</p> <ul style="list-style-type: none"> Faces, edges and vertices of 3-D objects Triangles, quadrilaterals, pentagons, hexagons, octagons <p>Shape and Space – Transformations</p> <ul style="list-style-type: none"> N/A <p>Statistics and Probability – Data Analysis</p> <ul style="list-style-type: none"> First-hand data Bar graphs <p>Statistics and Probability – Chance and Uncertainty</p> <ul style="list-style-type: none"> N/A 	<p>A1 say the number sequence forward and backward from 0 to 1000 by</p> <ul style="list-style-type: none"> 5s, 10s or 100s using any starting point 3s using starting points that are multiples of 3 4s using starting points that are multiples of 4 25s using starting points that are multiples of 25 [C, CN, ME] <p>A2 represent and describe numbers to 1000, concretely, pictorially, and symbolically [C, CN, V]</p> <p>A3 compare and order number to 1000 [C, R, V]</p> <p>A4 estimate quantities less than 1000 using referents [ME, PS, R, V]</p> <p>A5 illustrate, concretely and pictorially, the meaning of place value for numeral to 1000 [C, CN, R, V]</p> <p>A6 describe and apply mental mathematics strategies for adding two 2-digit numerals, such as</p> <ul style="list-style-type: none"> Adding from left to right Taking one addend to the nearest multiple of ten and then compensating Using doubles [C, ME, PS, R, V] <p>A7 describe and apply mental mathematics strategies for subtracting two 2-digit numerals, such as</p> <ul style="list-style-type: none"> Taking the subtrahend to the nearest multiple of ten and then compensating Thinking of addition Using doubles [C, ME, PS, R, V] <p>A8 apply estimation strategies to predict sums and differences of two 2-digit numerals in a problem solving context [C, ME, PS, R,]</p> <p>A9 demonstrate an understanding of addition and subtraction of numbers with answers to 1000 (limited to 1,2, and 3-digit numerals by</p> <ul style="list-style-type: none"> Using personal strategies for adding and subtracting with and without the support of manipulatives Creating and solving problems in contexts that involve addition and subtraction of numbers concretely, pictorially, and symbolically [C, CN, ME, PS, R] <p>A10 apply mental mathematics strategies and number properties, such as</p> <ul style="list-style-type: none"> Using doubles Making 10 Using the commutative property Using the property of zero Thinking addition for subtraction [C, CN, ME, R, V] <p>A11 demonstrate an understanding of multiplication to 5 X 5 by</p> <ul style="list-style-type: none"> Representing and explaining multiplication using equal grouping and arrays Creating and solving problems in context that involve multiplication Modelling multiplication using concrete and visual representations, and recoring the process symbolically Relating multiplication to repeated addition Relating multiplication to division [C, CN, PS, R] <p>A12 demonstrate an understanding of division by</p> <ul style="list-style-type: none"> Representing and explaining division using equal sharing and equal grouping Creating and solving problems in context that involve equal sharing and equal grouping Modelling equal sharing and equal grouping using concrete and visual representations, and recording the process symbolically Relating division to repeated subtraction Relating division to multiplication <p>(limited to division related to multiplication facts up to 5 x 5) [C, CN, PS, R]</p> <p>A13 demonstrate an understanding of fractions by</p> <ul style="list-style-type: none"> Explaining that a fraction represents a part of a whole Describing situation in which fractions are used Comparing fractions of the same whole with like denominators [C, CN, ME, PS, R, V] <p>B1 demonstrate an understanding of increasing patterns by</p> <ul style="list-style-type: none"> describing extending comparing 	<ul style="list-style-type: none"> PE: Measuring, recording, graphing and timing fitness activities Theme <u>Space</u>: comparing distances between planets and using ordinal numbers <u>Nutrition</u>: measure ingredients <u>Plants</u>: -Measure circumference of maple trees -Record growth of potato plants and weigh the harvest -Record growth of wheat and weigh the harvest – compare the weight of the kernels of wheat to the ground flour <u>Structures</u>: building 3D structures using the properties of 3D shapes <u>Canadian Communities</u>: graphing different temperatures across Canada Art: - using leaf patterns - making cityscapes with different geometric shapes - making polygon monsters

			<ul style="list-style-type: none"> creating patterns using manipulatives, diagrams, sounds, and actions (numbers to 1000) [C, CN, PS, R, V] <p>B2 demonstrate an understanding of decreasing patterns by</p> <ul style="list-style-type: none"> describing extending comparing creating patterns using manipulatives, diagrams, sounds, and actions (numbers to 1000) [C, CN, PS, R, V] <p>B3 solve one-step addition and subtraction equations involving symbols representing an unknown number</p> <p>C1 relate the passage of time to common activities using non-standard and standard units (minutes, hours, days, weeks, months, years) [CN, ME, R]</p> <p>C2 relate the number of seconds to a minute, the number of minutes to an hour, and the number of days to a month in a problem-solving context [C, CN, PS, R, V]</p> <p>C3 demonstrate an understanding of measuring length (cm, m) by</p> <ul style="list-style-type: none"> selecting and justifying referents for the units cm and m modelling and describing the relationship between the units cm and m estimating length using referents measuring and recording length, width, and height [C, CN, ME, PS, R, V] <p>C4 demonstrate an understanding of measuring mass (g, kg) by</p> <ul style="list-style-type: none"> selecting and justifying referents for the units g and kg modelling and describing the relationship between the units g and kg estimating mass using referents measuring and recording mass [C, CN, ME, PS, R, V] <p>C5 demonstrate an understanding of perimeter of regular and irregular shapes by</p> <ul style="list-style-type: none"> estimating perimeter using referents for centimetre or metre measuring and recording perimeter (cm, m) constructing different shapes for a given perimeter (cm, m) to demonstrate that many shapes are possible for a perimeter [C, ME, PS, R, V] <p>C6 describe 3-D objects according to the shape of the faces, and the number of edges and vertices [C, CN, PS, R, V]</p> <p>C7 sort rectangular and irregular polygons including</p> <ul style="list-style-type: none"> triangles quadrilaterals pentagons hexagons octagons <p>according to the number of sides [C, CN, R, V]</p> <p>D1 collect first-hand data and organize it using</p> <ul style="list-style-type: none"> tally marks line plots charts lists <p>to answer questions [C, CN, V]</p> <p>D2 construct, label and interpret bar graphs to solve problems [PS, R, V]</p>	
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Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will: A. Number, B. Pattern and Relations, C. Shape and Space, D. Statistics and Probability (categories for K – 9)	Cross Curricular Connections
4	<ul style="list-style-type: none"> How does order in creation reflect God's faithfulness? Why is Math important? How did Math as a discipline develop? How is Math used in our world? What are the limits of Math? How can Math be misused? How should we use Math to serve God in the world around us? 	<p>Number</p> <ul style="list-style-type: none"> Numbers in-depth to 10 000 Addition and subtraction to 10 000 Multiplication and division of numbers Fractions less than or equal to one Decimals to hundredths <p>Patterns and Relations – Patterns</p> <ul style="list-style-type: none"> Patterns in tables and graphs <p>Patterns and Relations – Variables and Equations</p> <ul style="list-style-type: none"> Symbols to represent unknowns One-step equations <p>Shape and Space – Measurement</p>	<p>A1 represent and describe whole numbers to 10 000, pictorially and symbolically [C, CN, V]</p> <p>A2 compare and order numbers to 10 000 [C, CN]</p> <p>A3 demonstrate an understanding of addition of numbers with answers to 10 000 and their corresponding subtractions (limited to 3 and 4-digit numerals) by</p> <ul style="list-style-type: none"> using personal strategies for adding and subtracting estimating sums and differences solving problems involving addition and subtraction [C, CN, ME, PS,R] <p>A4 explain the properties of 0 and 1 for multiplication, the property of 1 for division [C, CN,R]</p> <p>A5 describe and apply mental mathematics strategies, such as</p> <ul style="list-style-type: none"> skip counting from a known fact using doubling or halving using doubling or halving and adding or subtracting one more group 	<p>Reading—Graphing Non-fiction Text Features</p> <p>Art—</p> <ul style="list-style-type: none"> Fraction Art Geometry City Water Color City <p>Theme—</p> <ul style="list-style-type: none"> Graphing Weather First Nations Measurements

	<ul style="list-style-type: none"> Digital clocks, analog clocks, and calendar dates Area of regular and irregular 2-D shapes <p>Shape and Space – 3-D Objects and 2-D Shapes</p> <ul style="list-style-type: none"> Rectangular and triangular prisms <p>Shape and Space – Transformations</p> <ul style="list-style-type: none"> Line symmetry <p>Statistics and Probability – Data Analysis</p> <ul style="list-style-type: none"> Many-to-one correspondence including bar graphs and pictographs <p>Statistics and Probability – Chance and Uncertainty</p> <ul style="list-style-type: none"> N/A 		<ul style="list-style-type: none"> using patterns in the 9s facts using repeated doubling <p>To determine basic multiplication facts to 9x9 and related division facts [C, CN, ME, PS,R,]</p> <p>A6 demonstrate an understanding of multiplication (2 or 3-digit by 1-digit) to solve problems by</p> <ul style="list-style-type: none"> using personal strategies for multiplication with and without concrete materials using arrays to represent multiplication connecting concrete representations to symbolic representation estimating products [C, CN, ME, PS,R, V] <p>A7 demonstrate an understanding of division (1-digit divisor and up to 2-digit dividend) to solve problems by</p> <ul style="list-style-type: none"> using personal strategies for dividing with and without concrete materials estimating quotients relating division to multiplication [C, CN, ME, PS,R, V] <p>A8 demonstrate an understanding of fractions less than or equal to one by using concrete and pictorial representations to</p> <ul style="list-style-type: none"> name and record fractions for the parts of a whole or a set compare and order fractions model and explain that for different wholes, two identical fractions may not represent the same quantity provide examples of where fractions are used [C, CN, PS,R, V] <p>A9 describe and represent decimals (tenths and hundredths) concretely, pictorially, and symbolically [C, CN,R, V]</p> <p>A10 relate decimals to fractions (to hundredths) [CN, R, V]</p> <p>A11 demonstrate an understanding of addition and subtraction of decimals (limited to hundredths) by</p> <ul style="list-style-type: none"> using compatible numbers estimating sums and differences using mental math strategies to solve problems [C, ME, PS,R, V] <p>B1 identify and describe patterns found in tables and charts, including a multiplication chart [C, CN, PS, V]</p> <p>B2 reproduce a pattern shown in a table or chart using concrete materials [C, CN, V]</p> <p>B3 represent and describe patterns and relationships using charts and table to solve problems [C, CN, PS,R, V]</p> <p>B4 identify and explain mathematical relationships using charts and diagrams to solve problems [CN, PS,R, V]</p> <p>B5 express a given problem as an equation in which a symbol is used to represent an unknown number [CN, PS,R]</p> <p>B6 solve one-step equations involving a symbol to represent an unknown number [C, CN, PS,R, V]</p> <p>C1 read and record time using digital and analog clocks, including 24-hour clocks [C, CN, V]</p> <p>C2 read and record calendar dates in a variety of formats [C, V]</p> <p>C3 demonstrate an understanding of area of regular and irregular 2-D shapes by</p> <ul style="list-style-type: none"> recognizing that area is measured in square units selecting and justifying referents for the units cm^2 or m^2 estimating area by using referents by cm^2 or m^2 determining and recording area (cm^2 or m^2) constructing different rectangles for a given area (cm^2 or m^2) in order to demonstrate that many different rectangles may have the same area [C, CN, ME, PS,R, V] <p>C4 describe and construct rectangular and triangular prisms [C, CN, R, V]</p> <p>C5 demonstrate an understanding of line symmetry by</p> <ul style="list-style-type: none"> identifying symmetrical 2-D shapes creating symmetrical 2-D shapes drawing one or more lines of symmetry in a 2-D shape [C, CN, V] <p>D1 demonstrate an understanding of many-to-one correspondence [C, R, T,V]</p> <p>D2 construct and interpret pictographs and bar graphs involving many-to-one correspondence to draw conclusions [C, PS,R, V]</p>	
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Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will: A. Number, B. Pattern and Relations, C. Shape and Space, D. Statistics and Probability (categories for K – 9)	Cross Curricular Connections
5	<ul style="list-style-type: none"> How does order in creation reflect God's faithfulness? Why is Math important? 	<p>Number</p> <ul style="list-style-type: none"> Numbers in-depth to 1 000 000 Estimation strategies for calculations and problem solving 	<p>A1 represent and describe whole numbers to 1 000 000 [C, CN, V, T]</p> <p>A2 use estimation strategies including</p> <ul style="list-style-type: none"> Front-end rounding 	<p>Theme:</p> <ul style="list-style-type: none"> Simple Machines: Graphing (Measurement)

- How did Math as a discipline develop?
- How is Math used in our world?
- What are the limits of Math?
- How can Math be misused?
- How should we use Math to serve God in the world around us?

- Mental mathematics strategies for multiplication facts to 81 and corresponding division facts
 - Mental mathematics for multiplication
 - Multiplication for 2-digit by 2-digit and division for 3-digit by 1 digit
 - Decimal and fraction comparison
 - Addition and subtraction of decimals
- Patterns and Relations – Patterns
- Prediction using a pattern rule
- Patterns and Relations – Variables and Equations
- Single-variable, one-step equations with whole number coefficients and solutions
- Shape and Space – Measurement
- Perimeter and area of rectangles
 - Length, volume, and capacity
- Shape and Space – 3-D Objects and 2-D Shapes
- Parallel, intersecting, perpendicular, vertical and horizontal edges and faces
 - Rectangles, squares, trapezoids, parallelograms and rhombuses
- Shape and Space – Transformations
- 2-D shape single transformation
- Statistics and Probability – Data Analysis
- First-hand and second-hand data
 - Double bar graphs
- Statistics and Probability – Chance and Uncertainty
- Likelihood of a single outcome

- Compensation'
 - compatible numbers in problem-solving contexts [C, CN, ME, PS,R, V]
- A3 apply mental mathematics strategies and number properties, such as
- skip counting from a known fact
 - using doubling or halving
 - using patterns in the 9s facts'
 - using repeated doubling or halving
- to determine answers for basic multiplication facts to 81 and related division facts [C, CN, ME, R, V]
- A4 apply mental mathematics strategies for multiplication, such as
- annexing then adding zero
 - halving and doubling
 - using the distributive property [C, ME, R]
- A5 demonstrate an understanding of multiplication (2-digit by 2-digit) to solve problems [C, CN, PS, V]
- A6 demonstrate, with and without concrete materials, an understanding of division (3-digit by 1-digit) and interpret remainders to solve problems [C, CN, PS]
- A7 demonstrate an understanding of fractions by using concrete and pictorial representations to
- create sets of equivalent fraction
 - compare fractions with like and unlike denominators [C, CN, PS,R, V]
- A8 describe and represent decimals (tenths, hundredths, thousandths) concretely, pictorially, and symbolically [C, CN, R, V]
- A9 relate decimals to fractions (to thousandths) [CN, R, V]
- A10 compare and order decimals (to thousandths) by using
- benchmarks
 - place value
 - equivalent decimals [CN, R, V]
- A11 demonstrate an understanding of addition and subtraction of decimals (limited to thousandths) [C, CN, PS,R, V]
- B1 determine the pattern rule to make predictions about subsequent elements [C, CN, PS,R, V]
- B2 solve problems involving single-variable, one-step equations with whole number coefficients and whole number solutions [C, CN, PS,R]
- C1 design and construct different rectangles given either perimeter or area or both (whole numbers) and draw conclusions [C, CN, PS,R, V]
- C2 demonstrate an understanding of measuring length (mm) by
- selecting and justifying referents for the unit mm
 - modelling and describing the relationship between mm and cm units, and between mm and m units [C, CN, ME, PS,R, V]
- C3 demonstrate and understanding of volume by
- selecting and justifying referents for cm^3 or m^3 units
 - estimating volume by using referents for cm^3 or m^3
 - measuring and recording volume (cm^3 or m^3)
 - constructing rectangular prisms for a given volume [C, CN, ME, PS, R, V]
- C4 demonstrate an understanding of capacity by
- describing the relationship between mL and L
 - selecting and justifying referents for mL or L units
 - estimating capacity by using referents for mL or L
 - measuring and recording capacity (mL or L) [C, CN, ME, PS,R, V]
- C5 describe and provide examples of edges and faces of 3-D objects, and sides of 2-D shapes that are
- parallel
 - intersecting
 - perpendicular
 - vertical
 - horizontal [C, CN, PS, R, T, V]
- C6 identify and sort quadrilaterals, including
- rectangles
 - squares
 - trapezoids
 - parallelograms
 - rhombuses
- according to their attributes [C, R, V]
- C7 perform a single transformation (translation, rotation, or reflection) of a 2-D shape (with or

- Immigration: Graphing (Measurement)
 - Body Systems: Rate per minute (Measurement)
 - Government: Minority/majority voting applies to fractions and decimals
 - Mapping: Scales (Measurement)
 - Various theme experiments: Measurement
- Bible/Writing: Creating bio-cubes (Shapes and Space)
- PE: Measurement in Track and Field
- Parent Visits: Math application-- How do you use math in your job?

			<p>without technology) and draw and describe the image [C, CN, T, V]</p> <p>C8 identify a single transformation, including a translation, rotation, and reflection of 2-D shapes [C, T, V]</p> <p>D1 differentiate between first-hand and second-hand data [C, R, T, V]</p> <p>D2 construct and interpret double bar graphs to draw conclusions [C, PS, R, T, V]</p> <p>D3 describe the likelihood of a single outcome occurring using words such as</p> <ul style="list-style-type: none">• impossible• possible• certain [C, CN, PS,R,] <p>D4 compare the likelihood of two possible outcomes occurring using words such as</p> <ul style="list-style-type: none">• less likely• equally likely• more likely [C, CN, PS,R,]	
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Math Curriculum Map Grades 6 - 8

Planning for Assessment (Teaching Strategies), Assessment Indicators (Assessment Activities) and resources are listed in course overviews

Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will: A. Number, B. Pattern and Relations, C. Shape and Space, D. Statistics and Probability (categories for K – 9)	Cross Curricular Connections
6	<ul style="list-style-type: none"> How does order in creation reflect God's faithfulness? Why is Math important? How did Math as a discipline develop? How is Math used in our world? What are the limits of Math? How can Math be misused? How should we use Math to serve God in the world around us? 	<p>Number</p> <ul style="list-style-type: none"> Numbers in-depth greater than 1 000 000 and smaller than one thousandth Factors and multiples Improper fractions and mixed numbers Ratio and whole number percent Integers Multiplication and division of decimals Order of operations excluding components <p>Patterns and Relations – Patterns</p> <ul style="list-style-type: none"> Patterns and relationships in graphs and tables including tables of value <p>Patterns and Relations – Variables and Equations</p> <ul style="list-style-type: none"> Letter variable representation of number relationships Preservation of equality <p>Shape and Space – Measurement</p> <ul style="list-style-type: none"> Perimeter and area of rectangles Length, volume, and capacity <p>Shape and Space – 3-D Objects and 2-D Shapes</p> <ul style="list-style-type: none"> Types of triangles Regular and irregular polygons <p>Shape and Space – Transformations</p> <ul style="list-style-type: none"> Combinations of transformations Single transformation in the first quadrant of the Cartesian plane <p>Statistics and Probability – Data Analysis</p> <ul style="list-style-type: none"> Line graphs Methods of data collection Graph data <p>Statistics and Probability – Chance and Uncertainty</p> <ul style="list-style-type: none"> Experimental and theoretical probability 	<p>A1 Demonstrate an understanding of place value for numbers</p> <ul style="list-style-type: none"> greater than one million less than one thousandth [C, CN, R, T] <p>A2 solve problems involving large numbers, using technology [ME, PS, T]</p> <p>A3 demonstrate an understanding of factors and multiples by</p> <ul style="list-style-type: none"> determining multiples and factors of numbers less than 100 identifying prime and composite numbers solving problems involving multiples [PS, R, V] <p>A4 relate improper fractions to mixed numbers [CN, ME, R, V]</p> <p>A5 demonstrate an understanding of ratio, concretely, pictorially, and symbolically [C, CN, PS, R, V]</p> <p>A6 demonstrate an understanding of percent (limited to whole numbers) concretely, pictorially, and symbolically [C, CN, PS, R, V]</p> <p>A7 demonstrate an understanding of integers, concretely, pictorially, and symbolically [C, CN, R, V]</p> <p>A8 demonstrate an understanding of multiplication and division of decimals (1-digit whole number multipliers and 1-digit natural number divisors) [C, CN, ME, PS, R, V]</p> <p>A9 explain and apply the order of operations, excluding exponents, with and without technology (limited to whole numbers) [CN, ME, PS, T]</p> <p>B1 demonstrate an understanding of relationships within tables of values to solve problems [C, CN, PS, R]</p> <p>B2 represent and describe patterns and relationships using graphs and tables [C, CN, ME, PS, R, V]</p> <p>B3 represent generalizations arising from number relationships using equations with letter variables [C, CN, PS, R, V]</p> <p>B4 demonstrate and explain the meaning of preservation of equality concretely, pictorially, and symbolically [C, CN, PS, R, V]</p> <p>C1 demonstrate an understanding of angles by</p> <ul style="list-style-type: none"> identifying examples of angles in the environment classifying angles according to their measure estimating the measure of angles using 45°, 90°, 180°, as reference angles determining angle measures in degrees drawing and labelling angles when the measure is specified [C, CN, ME, V] <p>C2 demonstrate that the sum of interior angles is:</p> <ul style="list-style-type: none"> 180° in a triangle 360° in a quadrilateral [C, R] <p>C3 develop and apply a formula for determining the</p> <ul style="list-style-type: none"> perimeter of polygons area of rectangles volume of right rectangular prisms [C, CN, PS, R, V] <p>C4 construct and compare triangles, including</p> <ul style="list-style-type: none"> scalene isosceles equilateral right obtuse acute <p>in different orientations [C, PS, R, V]</p> <p>C5 describe and compare the sides and angles of regular and irregular polygons [C, PS, R, V]</p> <p>C6 perform a combination of translation(s), rotations(s), and/or reflection(s) on a single 2-D shape, with and without technology, and draw and describe the image [C, CN, PS, T, V]</p> <p>C7 perform a combination of successive transformations of 2-D shapes to create a design, and identify and describe the transformations [C, CN, T, V]</p> <p>C8 identify and plot points in the first quadrant of a Cartesian plane using whole number ordered pairs [C, CN, V]</p> <p>C9 perform and describe single transformations of a 2-D shape in the first quadrant of a Cartesian</p>	<p>Culture Studies (Social Studies)</p> <ol style="list-style-type: none"> Use the Smart Board lesson entitled "Graphing Coordinates" to introduce the Cartesian plane. Discuss how this can be applied to working with maps. Followup with "Coordinate Plan" Smart Board presentation and apply knowledge to working with maps. Complete World Map Reading Skills Cards 4 – 5. Use an outline map of Canada to teach scale and review provinces and capitals. <p>Diversity of Life, Extreme Environments (Science)</p> <ol style="list-style-type: none"> Application of big and small numbers (big numbers are extreme environments, small numbers = diversity of life.

			plane (limited to whole number vertices) [C, CN, PS, T, V] D1 create, label, and interpret line graphs to draw conclusions [C, CN, PS, R, V] D2 select, justify, and use appropriate methods of collecting data, including <ul style="list-style-type: none"> questionnaires experiments databases electronic media [C, PS, T] D3 graph collected data and analyze the graph to solve problems [C, CN, PS] D4 demonstrate an understanding of probability by <ul style="list-style-type: none"> identifying all possible outcomes of a probability experiment differentiating between experimental and theoretical probability determining the theoretical probability of outcomes in a probability experiment determining the experimental probability of outcomes in a probability experiment comparing experimental results with the theoretical probability for an experiment [C, ME, PS, T] 	
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Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will: A. Number, B. Pattern and Relations, C. Shape and Space, D. Statistics and Probability (categories for K – 9)	Cross Curricular Connections
7	<ul style="list-style-type: none"> How does order in creation reflect God's faithfulness? Why is Math important? How did Math as a discipline develop? How is Math used in our world? What are the limits of Math? How can Math be misused? How should we use Math to serve God in the world around us? 	Number <ul style="list-style-type: none"> Divisibility rules Addition, subtraction, multiplication, and division of numbers Percent from 1% to 100% Decimal and fraction relationships for repeating and terminating decimals Addition and subtraction of positive fractions and mixed numbers Addition and subtraction of integers Patterns and Relations – Patterns <ul style="list-style-type: none"> Table of values and graphs of linear relations Patterns and Relations – Variables and Equations <ul style="list-style-type: none"> Preservation of equality Expressions and equations One-step linear equations Shape and Space – Measurement <ul style="list-style-type: none"> Properties of circles Area of triangles, parallelograms and circles Shape and Space – 3-D Objects and 2-D Shapes <ul style="list-style-type: none"> Geometric constructions Shape and Space – Transformations <ul style="list-style-type: none"> Four quadrants of the Cartesian plane Transformation in the four quadrants of the Cartesian plane Statistics and Probability – Data Analysis <ul style="list-style-type: none"> Central tendency, outliers and range Circle graphs Statistics and Probability – Chance and Uncertainty <ul style="list-style-type: none"> Ratios, fractions, and percent to express probabilities Two independent events Tree diagrams for independent events 	A1 determine and explain why a number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10 and why a number cannot be divided by 0 [C, R] A2 demonstrate an understanding of the addition, subtraction, multiplication, and division of decimals (for more than 1-digit divisors or 2-digit multipliers, the use of technology is expected) to solve problems [ME, PS, T] A3 solve problems involving percent from 1% to 100% [C, CN, PS, R, T] A4 demonstrate an understanding of the relationship between positive repeating decimals and positive fractions, and positive terminating decimals and positive fractions [C, CN, R, T] A5 demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators, concretely, pictorially, and symbolically (limited to positive sums and differences) [C, CN, ME, PS, R, V] A6 demonstrate an understanding of addition and subtraction of integers, concretely, pictorially, and symbolically [C, CN, PS, R, V] A7 compare and order positive fractions, positive decimals (t thousandths) and whole numbers by using <ul style="list-style-type: none"> benchmarks place value equivalent fractions and / or decimals [CN, R, V] B1 demonstrate an understanding of oral and written patterns and their equivalent linear relations [C, CN, R] B2 create a table of values from a linear relation, graph the table of values, and analyze the graph to draw conclusions and solve problems [C, CN, R, V] B3 demonstrate an understanding of preservation of equality by <ul style="list-style-type: none"> modelling preservation of equality concretely, pictorially, and symbolically applying preservation of equality to solve equations [C, CN, PS, R, V] B4 explain the difference between an expression and an equation [C, CN] B5 evaluate an expression given the value of the variable(s) [CN, R] B6 model and solve problems that can be represented by one-step linear equations of the form $x + a = b$, concretely, pictorially, and symbolically, where a and b are integers [CN, PS, R, V] B7 model and solve problems that can be represented by linear equations of the form <ul style="list-style-type: none"> $ax + b = c$ $ax = b$ $x/a = b, a \neq 0$ concretely, pictorially, and symbolically, where $a, b,$ and c are whole numbers [CN, PS, R, V] C1 demonstrate an understanding of circles by <ul style="list-style-type: none"> describing the relationships among radius, diameter, and circumference of circles determining the sum of the central angles relating circumference to pi constructing circles with a given radius or diameter solving problems involving the radii, diameters, and circumferences of circles [C, CN, R, V] C2 develop and apply a formula for determining the area of <ul style="list-style-type: none"> triangles parallelograms 	<ol style="list-style-type: none"> Take students out into shopping centers, grocery stores to assess costs of eating according to the Canada Food Guide (plan dinner meals for one week and then go grocery shopping, add tax, etc.) and determine the cost for a family of four. (decimals, percent, unit rate) (HCE) With the study of Ancient Greece and Rom, talk about geometry and the idea of the perfect square. (Social Studies) Study of Ancient Egypt – geometry and the construction of pyramids. (Social Studies)

			<ul style="list-style-type: none"> circles [CN, PS, R, V] <p>C3 perform geometric constructions, including</p> <ul style="list-style-type: none"> perpendicular line segments parallel line segments perpendicular bisectors angle bisectors [CN, R, V] <p>C4 identify and plot points in the four quadrants of a Cartesian plane using integral ordered pairs [C, CN, V]</p> <p>C5 perform and describe transformations (translations, rotations or reflections) of a 2-D shape in all four quadrants of a Cartesian plan (limited to integral number vertices) [CN, PS, T, V]</p> <p>D1 demonstrate an understanding of central tendency and range by</p> <ul style="list-style-type: none"> determining the measures of central tendency (mean, median, mode) and range determining the most appropriate measures of central tendency to report finding [C, PS, R, T] <p>D2 determine the effect on the mean, median, and mode when an outlier is included in a data set [C, CN, PS, R]</p> <p>D3 construct, label and interpret circle graphs to solve problems [C, CN, PS, R, T, V]</p> <p>D4 express probabilities as ratios, fractions, and percent [C, CN, R, V, T]</p> <p>D5 identify the sample space (where the combined sample space has 36 or fewer elements) for a probability experiment involving two independent events [C, ME, PS]</p> <p>D6 conduct a probability experiment to compare the theoretical probability (determined using a tree diagram, table or another graphic organizer) and experimental probability of two independent events [C, PS, R, T]</p>	
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Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will: A. Number, B. Pattern and Relations, C. Shape and Space, D. Statistics and Probability (categories for K – 9)	Cross Curricular Connections
8	<ul style="list-style-type: none"> How does order in creation reflect God's faithfulness? Why is Math important? How did Math as a discipline develop? How is Math used in our world? What are the limits of Math? How can Math be misused? How should we use Math to serve God in the world around us? 	<p>Number</p> <ul style="list-style-type: none"> Perfect squares and square roots Percent greater than or equal to 0% Rate, ratio, and proportional reasoning Multiplication and division of fractions and mixed numbers Multiplication and division of integers <p>Patterns and Relations – Patterns</p> <ul style="list-style-type: none"> Two-variable linear relations <p>Patterns and Relations – Variables and Equations</p> <ul style="list-style-type: none"> Linear equations <p>Shape and Space – Measurement</p> <ul style="list-style-type: none"> Pythagorean theorem 3-D object nets Surface area of right prisms and cylinders Formulas for right prisms and cylinders <p>Shape and Space – 3-D Objects and 2-D Shapes</p> <ul style="list-style-type: none"> Top, front, and side view of 3-D objects <p>Shape and Space – Transformations</p> <ul style="list-style-type: none"> Tessellations <p>Statistics and Probability – Data Analysis</p> <ul style="list-style-type: none"> Presentation of data <p>Statistics and Probability – Chance and Uncertainty</p> <ul style="list-style-type: none"> Independent events 	<p>A1 demonstrate an understanding of perfect squares and square roots, concretely, pictorially, and symbolically (limited to whole numbers) [C, CN, R, V]</p> <p>A2 determine the approximate square root of numbers that are not perfect squares (limited to whole numbers) [C, CN, ME, R, V]</p> <p>A3 demonstrate an understanding of percent greater than or equal to 0% [C, PS,R, V]</p> <p>A4 demonstrate an understanding of ratio and rate [C, CN, V]</p> <p>A5 solve problems that involve rates ratios, and proportional reasoning [C, CN, PS,R]</p> <p>A6 demonstrate an understanding of multiplying and dividing positive fractions and mixed numbers [C, CN, ME, PS]</p> <p>A7 demonstrate an understanding of multiplication and division of integers, concretely, pictorially, and symbolically [C, CN, PS,R, V]</p> <p>B1 graph and analyse two-variable linear relations [C, ME, PS, R, T, V]</p> <p>B2 model and solve problems using linear equations of the form</p> <ul style="list-style-type: none"> $ax = b$ $x/a = b, a \neq 0$ $ax + b = c$ $x/a + b = c, a \neq 0$ $a(x + b) = c$ <p>concretely, pictorially, and symbolically, where $a, b,$ and c are integers [C, CN, PS, V]</p> <p>C1 develop and apply the Pythagorean theorem to solve problems [CN, PS, R, V, T]</p> <p>C2 draw and construct nets for 3-D objects [C, CN, PS, V]</p> <p>C3 determine the surface area of</p> <ul style="list-style-type: none"> right rectangular prisms right triangular prisms right cylinders <p>to solve problems [C, CN, PS, R, V]</p> <p>C4 to develop and apply formulas for determining the volume of right prisms and right cylinders [C, CN, PS, R, V]</p> <p>C5 draw and interpret top, front, and side views of 3-D objects composed of right rectangular prisms [C, CN, PS, R, V]</p> <p>C6 demonstrate an understanding of tessellation by</p> <ul style="list-style-type: none"> explaining the properties of shapes that make tessellating possible creating tessellations <p>identifying tessellations in the environment [C, R, V, T]</p> <p>D1 critique ways in which data is presented [C, CN, ME, PS, R, V]</p> <p>D2 solve problems involving the probability of independent events [C, CN, PS, T]</p>	<ul style="list-style-type: none"> Students chart their food intake and create a circle graph representing their food intake and match it up to a food plate (HCE) Students are given money to go to the grocery store to buy food for a day (HCE) Students bring in a recipe and adjust it in order to feed the whole class or just a small group of friends (HEc) Use metaphor approach to introduce the combing of "like" terms. Eg. Two sheep + 3 cows + 2 sheep = 4 sheep + 2 cows (Language Arts - figurative language) Students create a "Mathbook" page for a famous mathematician or scientist, using PowerPoint presentation (Language Arts) "Pop box" – students bring in container that manufacturers use to retail their goods (Pringles, Pillsbury, juice containers, etc.). Students evaluate which box leads to the least waste and is therefore better for the environment. (Science) Castle creation (SS – Middle Ages)

Math Curriculum Map Grade 9

Planning for Assessment (Teaching Strategies), Assessment Indicators (Assessment Activities) and resources are listed in course overviews

Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will: A. Number, B. Pattern and Relations, C. Shape and Space, D. Statistics and Probability (categories for K – 9)	Cross Curricular Connections
9	<ul style="list-style-type: none"> • What is Algebra? Why do we use a letter to represent an unknown quantity? • How can we represent numbers in different ways to enable us to do calculations more efficiently? • Why do we need to classify numbers into different sets? How does that help us mathematically? • How does the sign or nature affect the value of the exponent? • How does the knowledge of linear relations help us in real life? • What is the general strategy to find the slope of a line? What does the slope tell us? • What is the fundamental approach or strategy in solving linear equations in one variable? • How can we express a relationship in the world around us into an algebraic expression to describe a general pattern or model and solve real life problems? • Why is it important mathematically to be able to manipulate polynomials? • How is the study of polynomials useful in real life? • What is the general strategy to find a missing angle? • What are some geometrical shapes in creation? • How does the knowledge of geometry help us in real life? • Where do we see symmetry in the world around us? • Where would we need to use scale factors? What fields of study would you need to scale? • Why is it useful to transform a figure in different ways? • Why is it important to be able to calculate the perimeter, surface area and volume of various shapes? • Where is the knowledge of shape of space relevant in our everyday life? • How is data analysis relevant and useful in real life? • What are real numbers and how are they organized? • Why is the study of data important and useful in our society? 	<p>Number</p> <ul style="list-style-type: none"> • powers • rational numbers • square root of positive rational numbers <p>Patterns and Relations – Patterns</p> <ul style="list-style-type: none"> • graph of linear relations • interpolation and extrapolation <p>Patterns and Relations – Variables and Equations</p> <ul style="list-style-type: none"> • linear equations • single variable linear inequalities • operations on polynomials <p>Shape and Space – Measurement</p> <ul style="list-style-type: none"> • circle properties <p>Shape and Space – 3-D Objects and 2-D Shapes</p> <ul style="list-style-type: none"> • surface area of composite 3-D objects • similarity of polygons <p>Shape and Space – Transformations</p> <ul style="list-style-type: none"> • scale diagrams of 2-D shapes • line and rotational symmetry <p>Statistics and Probability – Data Analysis</p> <ul style="list-style-type: none"> • data collections • population and sample data • project plan for collections, display, and analysis of data <p>Statistics and Probability – Chance and Uncertainty</p> <ul style="list-style-type: none"> • probability in society 	<p>A1 Demonstrate an understanding of powers with integral bases (excluding base 0) and whole number exponents by</p> <ul style="list-style-type: none"> • representing repeated multiplication using powers • using patterns to show that a power with an exponent of zero is equal to one • solving problems involving powers [C, CN, PS, R] <p>A2 demonstrate an understanding of operations on powers with integral bases (excluding base 0) and whole number exponents [C, CN, PS, R, T]</p> <p>A3 demonstrate an understanding of rational numbers by</p> <ul style="list-style-type: none"> • comparing and ordering rational numbers • solving problems that involve arithmetic operations on rational numbers [C, CN, PS, R, T, V] <p>A4 explain and apply the order of operations, including exponents, with and without technology [PS, T]</p> <p>A5 determine the square root of positive rational numbers that are perfect squares [C, CN, PS, R, T]</p> <p>A6 determine an approximate square root of positive rational numbers that are non-perfect squares [C, CN, PS, R, V]</p> <p>B1 generalize a pattern arising from a problem-solving context using linear equations and verify by substitution [C, CN, PS, V]</p> <p>B2 graph linear relations, analyse the graph, and interpolate or extrapolate to solve problems [C, CN, PS, R, V]</p> <p>B3 model and solve problems using linear equations of the form</p> <ul style="list-style-type: none"> • $ax = b$ • $x/a = b, a \neq 0$ • $ax + b = c$ • $x/a + b = c, a \neq 0$ • $ax = b + cx$ • $a(x=b) = c$ • $ax + b = cx + d$ • $a(bx + c) = d(ex + f)$ • $a/x = b, x \neq 0$ <p>where a, b, c, d, e and f are rational numbers [C, CN, PS, V]</p> <p>B4 explain and illustrate strategies to solve single variable linear inequalities with rational coefficients within a problem-solving context [C, CN, PS, R, V]</p> <p>B5 demonstrate an understanding of polynomials (limited to polynomials of degree less than or equal to 2) [C, CN, R, V]</p> <p>B6 model, record, and explain the operations of addition and subtraction of polynomial expressions, concretely, pictorially, and symbolically (limited to polynomials of degree less than or equal to 2) [C, CN, PS, R, V]</p> <p>B7 model, record, and explain the operations of multiplication and division of polynomial expressions (limited to polynomials of degree less than or equal to 2) by monomials, concretely, pictorially, and symbolically [C, CN, R, V]</p> <p>C1 solve problems and justify the solution strategy using circle properties, including</p> <ul style="list-style-type: none"> • the perpendicular from the centre of a circle to a chord bisects the chord • the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc • the inscribed angles subtended by the same arc are congruent • a tangent to a circle is perpendicular to the radius of the point of tangency [C, CN, PS, R, T, V] <p>C2 determine the surface area of composite 3-D objects to solve problems [C, CN, PS, R, V]</p> <p>C3 demonstrate an understanding of similarity of polygons [C, CN, PS, R, V]</p> <p>C4 draw and interpret scale diagrams of 2-D shapes [CN, R, T, V]</p> <p>C5 demonstrate an understanding of line and rotation symmetry [C, CN, PS, V]</p> <p>D1 describe the effect of</p> <ul style="list-style-type: none"> • bias • use of language 	<p>Eco-house project with Science Truss Project with teched</p>

			<ul style="list-style-type: none">• ethics• cost• time and timing• privacy• cultural sensitivity on the collection of data [C, CN, R, T] D2 select and defend the choice of using either a population or a sample of a population to answer a question[C, CN, PS, R] D3 develop and implement a project plan for the collection, display, and analysis of data by <ul style="list-style-type: none">• formulating a question for investigation• choosing a data collection method that includes social considerations• selecting a population or a sample• collecting the data• displaying the collected data in an appropriate manner• drawing conclusions to answer the question [C, PS, R, T, V] D4 demonstrate an understanding of the role of probability in society [C, CN, R, T]	
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Math Curriculum Map Grade 10

Planning for Assessment (Teaching Strategies), Assessment Indicators (Assessment Activities) and resources are listed in course overviews

Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will:	Cross Curricular Connections
AWM 10	<ul style="list-style-type: none"> Why is measurement important? Why is it important to be familiar with the different systems of measurement? How do we connect drawings to real-life objects? What are some geometrical shapes in creation? How does the knowledge of geometry help us in real life? How can I make wise purchasing decisions? Why is it important for me to understand a unit price? Why is it necessary to know about foreign currency exchange? How can I tell if I'm receiving a fair wage? What is algebra? Why do we use a letter to represent an unknown quantity? How can you represent a linear relationship on a graph? What is slope and what does it represent? How does the knowledge of linear relations help us in real life? How can we express a relationship in the world around us into a linear relation to describe a general pattern or model and solve real life problems? What is the general strategy to find the slope of a line? What does the slope tell us? 	<p>Measurement</p> <ul style="list-style-type: none"> SI and Imperial measurement systems regular, composite, and irregular 2-D shape and 3-D objects <p>Geometry</p> <ul style="list-style-type: none"> puzzles and games involving spatial reasoning Pythagorean theorem similarity of regular and irregular convex polygons primary trigonometric ratios parallel, perpendicular, transversal lines, and resulting angles acute, obtuse, straight, and reflex angles <p>Number</p> <ul style="list-style-type: none"> proportional reasoning through unit pricing and currency exchange forms of income <p>Algebra</p> <ul style="list-style-type: none"> manipulation and application of formulas 	<p>Measurement</p> <p>A1 Demonstrate an understanding of the Systeme International (SI) by:</p> <ul style="list-style-type: none"> describing the relationship of the units for length, area, volume, capacity, mass and temperatures applying strategies to convert SI units to imperial units [C, CN, ME, V] <p>A2 Demonstrate an understanding of the imperial system by:</p> <ul style="list-style-type: none"> describing the relationships of the units for length, area, volume, capacity, mass and temperature comparing the American and British imperial units for capacity applying strategies to convert imperial units to SI units [C, CN, ME, V] <p>A3 Solve and verify problems that involve SI and imperial linear measurements, including decimal and fractional measurements [CN, ME, PS, V]</p> <p>A4 Solve problems that involve SI and imperial area measurements of regular, composite and irregular 2-D shapes and 3-D objects, including decimal and fractional measurements, and verify the solutions [ME, PS, R, V]</p> <p>Geometry</p> <p>B1 analyse puzzles and games that involve spatial reasoning, using problem-solving strategies [C, CN, PS, R]</p> <p>B2 Demonstrate an understanding of the Pythagorean theorem by:</p> <ul style="list-style-type: none"> identifying situations that involve right triangles verifying the formula applying the formula solving problems [C, CN, PS, V] <p>B3 Demonstrate an understanding of similarity of convex polygons, including regular and irregular polygons [C, CN, PS, V]</p> <p>B4 Demonstrate an understanding of primary trigonometric rations (sine, cosine, tangent) by:</p> <ul style="list-style-type: none"> applying similarity to right triangles generalizing patterns from similar right triangles applying the primary trigonometric rations solving problems [CN, PS, R, T, V] <p>B5 Solve problems that involve parallel, perpendicular, and transversal lines, and pairs of angles formed between them [C, CN, PS, V]</p> <p>B6 Demonstrate an understanding of angles, including acute, right, obtuse, straight and reflex by:</p> <ul style="list-style-type: none"> drawing replicating and constructing bisecting solving problems [C, ME, PS, T, V] <p>Number</p> <p>C1 Solve problems that involve unit pricing and currency exchange, using proportional reasoning [CN, ME, PS, R]</p> <p>C2 Demonstrate an understanding of income, including:</p> <ul style="list-style-type: none"> wages salary contracts commissions piecework <p>to calculate gross pay and net pay [C, CN, R, T]</p> <p>Algebra</p> <p>D1 Solve problems that require the manipulation and application of formulas related to:</p> <ul style="list-style-type: none"> perimeter area the Pythagorean theorem primary trigonometric ratios income [C, CN, ME, PS, R,] 	<p>Building design (Tech Ed) Plan cost and quantity of food to be served in the cafeteria (Home Ec)</p>
FMP 10	<ul style="list-style-type: none"> What mathematical concepts have you learned in mathematics so far? 	<p>Measurement</p> <ul style="list-style-type: none"> SI and Imperial measurement systems 	<p>Measurement</p> <p>A1 Solve problems that involve linear measurement, using:</p>	<p>School addition design (courtyard)</p>

- What is order of operations and how do you use it?
- What are some of the various exponent laws and how do you use them?
- How are measurement and trigonometry applied to real life situations?
- How are various shapes related?
- How can surface area and volume be calculated?
- What are the trigonometric ratios?
- How can trig be applied to right angled triangles and other problems?
- How are exponents related to radicals?
- What are real numbers and how are they organized?
- What are exponent laws and how do you apply them?
- How do patterns help to understand exponents and radicals?
- What's a reciprocal?
- What real world applications are present for Radicals and Exponents?
- What are algebra tiles and how can you effectively use them?
- What are
 - Prime Factors?
 - Greatest Common Factors?
 - Least Common Multiples?
- How do you multiply various polynomials?
- How do you factor polynomials in for form
 - $x^2 + bx + c$
 - $ax^2 + bx + c$
- What are some examples of special polynomials?
- What are some ways we can represent functions and relations?
- How is a function different from a relation?
- What is the definition of a linear relationship?
- What is function notation and how does it work?
- What is domain and range and how is it related to the independent and dependent variables?
- How do you create an accurate and informative graph?
- What are three ways linear relations can be expressed?
- What information can be interpreted from various linear equations.
- What is slope and what does it tell us?
- How are parallel and perpendicular lines related?
- How do you graph linear equations?
- What is a linear system?
- How can linear systems be used to solve real world problems?
- What are some methods used to solve linear systems?
- What are the different types of solutions a linear system can have?

- surface area and volume of 3-D objects
- Algebra and Number
- factors of whole numbers
 - irrational numbers
 - powers with integral and rational exponents
 - multiplication of polynomial expressions
 - common and trinomial factors
- Relations and Functions
- relationships between data, graphs, and situations
 - relations and functions
 - slope
 - characteristics of linear relations and functions

- SI and imperial units of measure
 - estimation strategies
 - measurement strategies [ME, PS, V]
- A2 Apply proportional reasoning to problems that involve conversions between SI and imperial units of measure [C, ME, PS]
- A3 Solve problems, using SI and imperial units, that involve the surface area and volume of 3-D objects, including:
- right cones
 - right cylinders
 - right prisms
 - right pyramids
 - spheres [CN, PS, R, V]
- A4 Develop and apply the primary trigonometric ratios (sine, cosine, tangent) to solve problems that involve right triangles [C, CN, PS, R, T, V]
- Algebra and Number
- B1 Demonstrate an understanding of factors of whole numbers by determining the:
- prime factors
 - greatest common factor
 - least common multiple
 - square root
 - cube root [CN, ME, R]
- B2 Demonstrate an understanding of irrational numbers by:
- representing, identifying and simplifying irrational numbers
 - ordering irrational numbers [CN, ME, R, V]
- B3 Demonstrate an understanding of powers with integral and rational exponents [C, CN, PS, R]
- B4 Demonstrate an understanding of the multiplication of polynomial expressions (limited to monomials, binomials, and trinomials), concretely, pictorially, and symbolically [CN, R, V]
- B5 Demonstrate an understanding of common factors and trinomial factoring, concretely, pictorially and symbolically [C, CN, R, V]
- Relations and Functions
- C1 Interpret and explain the relationships among data, graphs and situations [C, CN, R, T, V]
- C2 Demonstrate an understanding of relations and functions [C, R, V]
- C3 demonstrate an understanding of slope with respect to:
- rise and run
 - line segments and lines
 - rate of change
 - parallel lines
 - perpendicular lines [PS, R, V]
- C4 describe and represent linear relations, using:
- word
 - ordered pairs
 - tables of values
 - graphs
 - equations [C, CN, R, V]
- C5 Determine the characteristics of the graphs of linear relations, including the:
- intercepts
 - slope
 - domain
 - range [CN, PS, R, V]
- C6 Relate linear relations expressed in:
- slope-intercept form ($y = mx + b$)
 - general form ($Ax + By + C = 0$)
 - slope-point form ($y - y_1 = m(x - x_1)$)
- to their graphs [CN, R, T, V]
- C7 Determine the equation of a linear relations, given:
- a graph
 - a point and the slope
 - two points
 - a point and the equation of a parallel or perpendicular line
- to solve problems [CN, PS, R, V]
- C8 Represent a linear function, using function notation [CN, ME, V]
- C9 Solve problems that involve systems of linear equations in two variable, graphically and algebraically [CN, PS, R, T, V]

Math Curriculum Map Grade 11

Planning for Assessment (Teaching Strategies), Assessment Indicators (Assessment Activities) and resources are listed in course overviews

Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will:	Cross Curricular Connections
AWM 11	<ul style="list-style-type: none"> • Why is measurement important? • Why is it important to be familiar with different systems of measurement? • How do we connect drawings to real-life objects? • What are some geometrical shapes in creation? • How does the knowledge of geometry help us in real-life? • How can I make wise financial decisions? • Why is it important for me to manage my finances? • How can a small piece of plastic (credit card) hurt of help me? • How do loans work? • What is debt and how can it affect me? • How can I use probability to make decisions? • Why would it be important to understand how probability works? • Why do I pay income tax? • What is algebra? Why do we use a letter to represent an unknown quantity? • How can you represent a linear relationship on a graph? • What is slope and what does it represent? • How does the knowledge of linear relations help us in real life? • How can we express a relationship in the world around us into a linear relation to describe a general pattern or model and solve real life problems? • What is the general strategy to find the slope of a line? What does the slope tell us? • How is data analysis relevant and useful in real life? • What are real numbers and how are they organized? • Why is the study of data important and useful in our society? 	<ul style="list-style-type: none"> • Surface Area of Prisms, Pyramids, Cylinders, Spheres and Cones. • Volume and Capacity • Solving for Angles, Lengths, and Distances • Scale Drawings and Models • Two-Dimensional Representations • Three-Dimensional Representations • Simple and Compound Interest • Credit Cards • Personal Loans, Credit • Personal Budgets • Solving Puzzles • Problem Solving • Using Formulas • Rise over Run • Grade, Angle of Elevation, Distance • Rate of Change • Complex Problems in Real World • Broken Line Graphs • Bar Graphs • Histograms • Circle Graphs 	<p>Measurement</p> <p>A1 solve problems that involve SI and imperial units in surface area measurements and verify the solutions [C, CN, ME, PS, V]</p> <p>A2 solve problems that involve SI and imperial units in volume and capacity measurements [C, CN, ME, PS, V]</p> <p>Geometry</p> <p>B1 solve problems that involve two and three right triangles [CN, PS, T, V]</p> <p>B2 solve problems that involve scale [PS, R, T, V]</p> <p>B3 model and draw 3-D objects and their views [CN, R, V]</p> <p>B4 draw and describe exploded views, component parts and scale diagrams of simple 3-D objects [CN, V]</p> <p>Number</p> <p>C1 analyze puzzles and games that involve numerical reasoning, using problem-solving strategies [C, CN, PS, R]</p> <p>C2 solve problems that involve personal budgets [CN, PS, R, T]</p> <p>C3 demonstrate an understanding of compound interest [CN, ME, PS, T]</p> <p>C4 demonstrate an understanding of financial institutions services used to access and manage finances [C, CN, R, T]</p> <p>C5 demonstrate understanding of credit options, including:</p> <ul style="list-style-type: none"> • credit cards • loans [CN, ME, PS, R] <p>Algebra</p> <p>D1 solve problems that require the manipulation and application of formulas related to:</p> <ul style="list-style-type: none"> • volume and capacity • surface area • slope and rate of change • simple interest • finance charges [CN, PS, R] <p>D2 demonstrate an understanding of slope:</p> <ul style="list-style-type: none"> • as rise over run • as rate of change • by solving problems [C, CN, PS, V] <p>D3 solve problems by applying proportional reasoning and unit analysis [C, CN, PS, R]</p> <p>Statistics</p> <p>E1 solve problems that involve creating and interpreting graphs, including:</p> <ul style="list-style-type: none"> • bar graphs • histograms • line graphs • circle graphs [C, CN, PS, R, T, V] 	<p>Building design (Tech Ed)</p> <p>Plan cost and quantity of food to be served in the cafeteria (Home Ec)</p>
FOM 11	<ul style="list-style-type: none"> • What is rate of change? • How do various rate of change affect our lives? • In what ways are rates of change presented to us in the world? • What is scale? • How can you change scale? • How do S.A. and volume compare of various shapes? • What are transversal and parallel lines and how are they similar and different? • What is the relationship between angles and parallel and transverse lines? • How are angles and polygons related? • What is the sine law and in what situations is it useful? • What is the cosine law and in what situations is it useful? • What is logic? 	<p>Measurement</p> <ul style="list-style-type: none"> • Comparing and depicting rates of change • Examining the effects of rates of change • Shapes and scale • Solving problems with shapes and scale • Demonstrating shapes and scale • Surface area of a 2-D shape • Surface area and volume of a 3-D shape • Solving problems with 3-D objects <p>Geometry</p> <ul style="list-style-type: none"> • Transverse and parallel lines • Angles in transversal and parallel lines • Creating parallel and transversal lines • Angles and polygons • Cosine law • Sine law <p>Logical Reasoning</p>	<p>Measurement</p> <p>A1 solve problems that involve the application of rates [CN, PS, R]</p> <p>A2 solve problems that involve scale diagrams, using proportional reasoning [CN, PS, R, V]</p> <p>A3 demonstrate an understanding of the relationships among scale factors, areas, surface areas and volumes of similar 2-D shapes and 3-D objects [C, CN, PS, R, V]</p> <p>Geometry</p> <p>B1 derive proofs that involve the properties of angles and triangles [CN, R, V]</p> <p>B2 solve problems that involve the properties of angles and triangles [CN, PS, V]</p> <p>B3 solve problems that involve the cosine law and the sine law, including the ambiguous case [CN, PS, R]</p> <p>Logical Reasoning</p> <p>C1 analyze and prove conjectures, using inductive and deductive reasoning, to solve problems [C, CN, PS, R]</p> <p>C2 analyze puzzles and games that involve spatial reasoning, using problem-solving strategies [CN, PS, R, V]</p> <p>Statistics</p> <p>D1 demonstrate an understanding of normal distribution, including:</p> <ul style="list-style-type: none"> • standard deviation 	<p>Statistics (current events in Social Studies)</p> <p>Using triangles in the design of structures (Tech Ed or set design)</p>

	<ul style="list-style-type: none"> • What is the difference between inductive and deductive reasoning? • What are conjectures? • How do I know a proof is true? • How are various games and puzzles related to mathematical reasoning? • What is a statistic? • What are the various properties of a normal curve and what do they mean? • What is a standard deviation? • What do confidence levels tell us about statistical information? • Where is a place where a basic knowledge of statistical data is useful? • What is a linear inequality? • How do you solve linear inequalities? • What is the quadratic equation and what does it show? • What are the various components of a quadratic graph, and what information do these components provide? • How can mathematics help s determine the validity of information presented to us? • What steps should w take to assess the accuracy and validity of information given to us? 	<ul style="list-style-type: none"> • Introduction to logical reasoning • Conjectures • Proofs • Validity of mathematical arguments • Math in games and puzzles <p>Statistics</p> <ul style="list-style-type: none"> • Standard deviation • “normal” statistics • Applied standard deviation • Confidence levels • Applying confidence levels in the media <p>Relations and Functions</p> <ul style="list-style-type: none"> • Linear inequalities • Graphing linear inequalities • Solving linear inequalities • Using technology to solve linear problems • Roots of a quadratic equation • Zeros of a quadratic equation' • vertex and symmetry <p>Mathematics Research project</p>	<ul style="list-style-type: none"> • z-scores [CN, PS, T, V] <p>D2 interpret statistical data, using:</p> <ul style="list-style-type: none"> • confidence intervals • confidence levels • margin of error [C, CN, R] <p>Relations and Functions</p> <p>E1 model and solve problems that involve systems of linear inequalities in two variables [CN, PS, T, V]</p> <p>E2 demonstrate an understanding of the characteristics of quadratic functions, including:</p> <ul style="list-style-type: none"> • vertex • intercepts • domain and range • axis of symmetry [CN, PS, T, V] <p>Mathematics Research Project</p> <p>F1 research and give a presentation on a historical event o an area of interest that involves mathematics [C, CN, ME, PS, R, T, V]</p>	
<p>PREC 11</p>	<ul style="list-style-type: none"> • How does order in creation reflect God's faithfulness? • Why is Math important? • How did Math as a discipline develop? • How is Math used in our world? • What are the limits of Math? • How can Math be misused? • How should we use Math to serve God in the world around us? 	<p>Review</p> <p>Simplify radicals Radical equations Abs val equations & inequalities</p> <p>Arithmetic sequences Arithmetic series Geometric sequences Geometric series Infinite geometric series</p> <p>Factoring/solving quadratics Intro to parabolas $y = a(x-p)^2+q$ Writing equations of parabolas Max/min Completing the square Max/min problems</p> <p>Systems by graphing Systems by add/sub Systems by add/sub + problems #solutions Substitutions Word problems Sketch inequalities Sketch quadratic inequalities</p> <p>Intro to 6 functions Reflections $y = 1/f(x)$ $y = f(x)$ $y = f(x)$ Circles</p> <p>Sketch polynomial $f(x)$ Write/sketch polynomials Quadratic formula Nature of the roots Polynomial division Synthetic division</p>	<p>A1 demonstrate an understanding of the absolute value of real numbers</p> <p>A2 Solve problems that involve operations on radicals and radical expressions with numerical and variable radicands</p> <p>A3 solve problems that involve radical equations (limited to square roots)</p> <p>A4 determine equivalent forms of rational expressions (limited to numerators and denominators that are monomials, binomials or trinomials)</p> <p>A5 perform operations on rational expression (limited to numerators and denominators that are monomials, binomials or trinomials)</p> <p>A6 solve problems that involve rational equations (limited to numerators and denominators that are monomials, binomials or trinomials)</p> <p>B1 demonstrate an understanding of angles in standard position (0° to 360°)</p> <p>B2 solve problems, using the three primary trigonometric ratios for angles from 0° to 360° standard position</p> <p>B3 solve problems, using the cosine law and sine law, including the ambiguous case</p> <p>C1 Factor polynomial expressions of the form:</p> <ul style="list-style-type: none"> • $ax^3 + bx = c, a \neq 0$ • $a^2x^2 - b^2y^2, a \neq 0, b \neq 0$ • $a(f(x))^2 + b(f(x))^2 + c, a \neq 0$ • $a^2(f(x))^2 - b^2(g(y))^2, a \neq 0, b \neq 0$ <p>where a, b and c are rational numbers</p> <p>C2 graph and analyze absolute value functions (limited to linear and quadratic functions) to solve problems</p> <p>C3 analyze quadratic functions of the form $y = a(x-p)^2 + q$ and determine the:</p> <ul style="list-style-type: none"> • vertex • domain and range • direction of opening • axis of symmetry • x- and y-intercepts <p>C4 analyze quadratic functions of the form $y = ax^2 + bx + c$ to identify characteristics of the corresponding graph, including:</p> <ul style="list-style-type: none"> • vertex • domain and range • direction of opening • axis of symmetry • x- and y-intercepts <p>and to solve problems</p> <p>C5 solve problems that involve quadratic equations</p>	<p>Geometry and Structure (with art) Buying a House project (socials, English, Art)</p>

	<p>Solving polynomial equations Remainder and factor theorem Sketch polynomial $f(x)$ Polynomial inequalities</p> <p>Simp/mult/div rational expressions Add/sub rational expressions Solve rational equations Rational problems</p> <p>Intro right triangles Applications Angles in standard position Trig func of angles in std pos Solve trig equations Special angles Reciprocal trig functions Area of triangle Cosine law Sine law</p>	<p>C6 solve, algebraically and graphically, problems that involve systems of linear-quadratic and quadratic-quadratic equations in two variables C7 solve problems that involve linear and quadratic inequalities in two variables C8 solve problems that involve quadratic inequalities in one variable C9 analyze arithmetic sequences and series to solve problems C10 analyze geometric sequences and series to solve problems C11 graph and analyze reciprocal functions (limited to the reciprocal of linear and quadratic functions)</p>	
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Math Curriculum Map Grade 12

Planning for Assessment (Teaching Strategies), Assessment Indicators (Assessment Activities) and resources are listed in course overviews

Grade	Essential Questions/ Unit Questions	Content	Learning Outcomes: By the end of grade level, the students will:	Cross Curricular Connections
MA 12	<ul style="list-style-type: none"> How does order in creation reflect God's faithfulness? Why is Math important? How did Math as a discipline develop? How is Math used in our world? What are the limits of Math? How can Math be misused? How should we use Math to serve God in the world around us? 	<p>Problem solving</p> <ul style="list-style-type: none"> Problems which involve multiple concepts <p>Quadratic equations</p> <ul style="list-style-type: none"> Conic sections <p>Functions</p> <ul style="list-style-type: none"> Transformations <p>Logs & exponents</p> <ul style="list-style-type: none"> Exponential and logarithmic functions Simplifying logarithmic expressions <p>Sequences and series</p> <ul style="list-style-type: none"> Geometric sequences and Series Sigma Notation <p>Trigonometry</p> <ul style="list-style-type: none"> Radian measure and conversions Graphs of trigonometric functions Period, amplitude, domain, and range Trigonometric identities Solving trigonometric equations <p>Statistics and probability</p> <ul style="list-style-type: none"> Combinations and permutations Probability and statistics 	<p>A1 drive and apply expressions to represent general terms for geometric growth and to solve problems</p> <p>A2 drive and apply expressions to represent sums for geometric growth and to solve problems</p> <p>A3 estimate sums of expressions represented by infinite geometric processes where the common ration, r, is $-1 < r < 1$</p> <p>A4 solve exponential equations having bases that are powers of one another</p> <p>A5 solve and verify exponential and logarithmic equations</p> <p>A6 solve and verify exponential and logarithmic identities</p> <p>A7 distinguish between degree and radian measure and solve problems using both</p> <p>A8 determine the exact and the approximate values of trigonometric ratios for any multiples of 0°, 30°, 45°, 60°, and 90° and $0 \text{ rad}, \pi/6 \text{ rad}, \pi/4 \text{ rad}, \pi/3 \text{ rad}, \pi/2 \text{ rad}$</p> <p>A9 solve first and second degree trigonometric equations over a specified domain</p> <ul style="list-style-type: none"> algebraically graphically <p>A10 determine the general solutions to trigonometric equations where the domain is the set of real numbers</p> <p>A11 analyse trigonometric identities</p> <ul style="list-style-type: none"> graphically algebraically for general cases <p>A12 use sum, difference, and double angle identities for sine and cosine to verify and simplify trigonometric expressions</p> <p>A13 change functions from exponential form to logarithmic form and vice versa</p> <p>A14 model, graph, and apply exponential functions to solve problems</p> <p>A15 model, graph, and apply logarithmic functions to solve problems</p> <p>A16 describe the three primary trigonometric functions as circular functions with reference to the unit circle and an angle in standard position</p> <p>A17 sketch and analyse the graphs of sine, cosine, and tangent functions, for</p> <ul style="list-style-type: none"> amplitude, if defined period domain and range asymptotes, if any behaviour under transformations <p>A18 use trigonometric functions to model and solve problems</p> <p>B1 describe how vertical and horizontal translations of functions affect graphs and their related equations:</p> <ul style="list-style-type: none"> $y = f(x - h)$ $y - k = f(x)$ <p>B2 describe how compressions and expansions of functions affect graphs and their related equations:</p> <ul style="list-style-type: none"> $y = a f(x)$ $y = f(kx)$ <p>B3 describe how reflections of functions in both axes and in the line $y = x$ affects graphs and their related equations:</p> <ul style="list-style-type: none"> $y = f(-x)$ $y = -f(x)$ $y = f^{-1}(x)$ <p>B4 using the graph and / or equation of $f(x)$, describe and sketch $1/f(x)$</p> <p>B5 using the graph and / or the equations of $f(x)$, describe and sketch $f(x)$</p> <p>B6 describe and perform single transformations and combinations of transformations on function and relations</p> <p>C1 use the fundamental counting principle to determine the number of different ways to perform multi-step operations</p> <p>C2 use factorial notation to determine different ways of arranging n distinct objects in a sequence</p>	<p>Exponents and Logs</p> <ul style="list-style-type: none"> business and banking biological growth (population) light attenuation radioactive decay sociology (population growth) technology (exponential growth) depreciation – budgeting <p>Trigonometry</p> <ul style="list-style-type: none"> periodic motions such as: <ul style="list-style-type: none"> tides time of sunset vibrating strings and springs waves light sound geometry in triangles and circles <p>Sequences and Series</p> <ul style="list-style-type: none"> pyramid schemes Greek philosophy (Zeno's paradox) payment schedules <p>Combinations and Permutations</p> <ul style="list-style-type: none"> vehicle licenses phone numbers hotel keys lottery tickets combination locks and passwords <p>Probability</p> <ul style="list-style-type: none"> games metereology

			<p>C3 determine the number of permutations of n different objects taken r at a time, and use this to solve problems</p> <p>C4 determine the number of combinations of n different objects taken r at a time, and use this to solve problems</p> <p>C5 solve problems, using the binomial theorem where the exponent n belongs to the set of natural numbers</p> <p>C6 construct a sample space for up to three events</p> <p>C7 classify events as independent or dependent</p> <p>C8 solve problems, using the probabilities of mutually exclusive and complementary events</p> <p>C9 determine the conditional probability of two events</p> <p>C10 solve probability problems involving permutations, combinations, and conditional probability</p>	
<p>CALC 12</p>	<ul style="list-style-type: none"> • How does order in creation reflect God's faithfulness? • Why is Math important? • How did Math as a discipline develop? • How is Math used in our world? • What are the limits of Math? • How can Math be misused? • How should we use Math to serve God in the world around us? 	<p>History</p> <ul style="list-style-type: none"> • The origins of calculus • Contributors to the development of calculus <p>Functions and Limits</p> <ul style="list-style-type: none"> • Rational, trigonometric, exponential, & logarithmic functions • Zeros, limits, and asymptotes • Continuity <p>Derivatives</p> <ul style="list-style-type: none"> • Notation • Tangents & secants • Definition of derivative • Calculating derivatives using the definition • Average & instantaneous rates of change • Derivatives of elementary functions • Sum, product, quotient, & power rules • Chain rules • Implicit functions <p>Applications</p> <ul style="list-style-type: none"> • Displacement, velocity and acceleration problems • Related rate problems • Min/max problems • Increasing/decreasing functions and concavity • Newton's iterative method and tangent line approx.. <p>Anti-differentiation</p> <ul style="list-style-type: none"> • Notation and definition • Anti-derivatives of known functions • Integrations formulas • Initial value problems <p>Applications</p> <ul style="list-style-type: none"> • Problems involving motion of a particle • Area beneath a curve • Solutions to differential equations • Exponential growth and decay 	<p>A. use a variety of methods to solve real-life, practical, technical, and theoretical problems</p> <p>B. understand that calculus was developed to help model dynamic situations</p> <p>C. understand the historical background and problems that led to the development of calculus</p> <p>D. represent and analyze rational, inverse trigonometric, base e exponential, natural logarithmic, elementary implicit, and composite functions, using technology as appropriate</p> <p>E. understand the concept of a limit of a function, notation used, and be able to evaluate the limit of a function</p> <p>F. understand the concept of a derivative and evaluate derivatives of a function using the definition of derivative</p> <p>G. determine derivatives of functions using a variety of techniques</p> <p>H. solve problems from a variety of fields including the Physical and Biological Sciences, Economics and Business</p> <p>I. use the first and second derivatives to describe the characteristic of the graph of a function</p> <p>J. recognize anti-differentiation (indefinite integral) as the reverse of the differentiation process</p> <p>K. use anti-differentiation to solve a variety of problems</p>	