Cologne Academy

Mathematics Department

Grade 5 Math

(Aligned Text: Holt McDougal Mathematics: Course 1**)**

Core Knowledge Curriculum – 92% Aligned

Adopted: 08/2014

Board Approved: 07/24/2014

Updated: 08/12/2017

Highlighted items indicate overlap of MN State Standards and the Core Knowledge Sequence.

Boxed items indicate content to be introduced post-MCAs.

Math Department Lesson Essentials

Topic: Title of lesson.

*Objective: Academic goal for students to achieve by end of lesson.

*Standard: MN State Standard or Core Knowledge Sequence reference.

Agenda: Sequence of instruction and activities

Closure: Brief summary/overview of lesson. May include formative assessment.

Homework: Continued practice of lesson. May be used as formative assessment.

*Indicates required components.

Note: The text has been as closely aligned with MN State Standards but additional resources may be required to include all skills (including within the Core Knowledge Sequence). Resources may be located on the s:drive under Mathematics Resources and by grade level or on the Cologne Academy intranet. Further research/exploration may be required to locate additional resources.

Important Dates 2017 – 2018
Pretest: 28 – 29 August
Interim 1: 30 – 31 October
Interim 2: 11 – 12 January
Interim 3: 19 – 20 March
Interim 4: 14 – 15 May
OLPA: 29 January – 2 February
MCA: 17 – 19 April
Dates may be subject to change.

Overview

Strand(s): Number & Operations

Unit 1: Operations, Fractions, and Decimals

Approximate Duration of Study: 8 Weeks Between Interims.

MNSS	Knowledge	Skills
Number Sense Core Knowledge	**Students will know that:** • Numbers can be represented in a variety of ways. • A **digit** represents a **place value** in a whole number. • Place value can be used to make comparisons, order numbers from least to greatest and vice versa, and **round**. • The **Greatest Common Factor (GCF)** of two or more whole numbers is the greatest whole number that divides evenly into each number. • The **Least Common Multiple (LCM)** of two or more whole numbers is the common **multiple** with the least value. • A **prime number** is a whole number greater than 1 that has exactly two **factors**, one and itself. • A **composite number** is a whole number that has more than two factors. • A **power** consists of a **base** and its **exponent**. The exponent tells how many times to use the base as a factor. ○ $5^3 = 5 \cdot 5 \cdot 5$ • Prime Factorization is written in **ascending** order according to the value of the base.	**Student will be able to:** • Read and write numbers (in digits and words) up to the billions. • Recognize place value up to billions. • Order and compare numbers to 999,999,999 using the signs $<$, $>$, and $=$. • Round to the nearest: ten, hundred, thousand, and hundred thousand. • Determine the GCF of given numbers. • Determine the LCM of given numbers. • Identify numbers under 100 as prime or composite. • Identify **prime factors** of numbers to 100. • Write prime factors using **exponential notation** for multiple primes.

Unit 1

	Students will know that:	Student will be able to:

Real Numbers
 	
Introduction
	• A rational number is any number that can be written as a fraction where the denominator is not 0.
	• Between any two integers, are an infinite number of rational numbers.
	   o *Between 5 and 6 lie 5.5, 5.75, 5.83, 5.98. etc…*
		• Classify numbers according within the <u>real number</u> system.
		   o Real Numbers: <u>Rational, Integer, Whole, Natural.</u>
		• Identify a set and the members of a set, indicated by { }. (This concept can be extended beyond Real Number Sets.)

	• Rational numbers have a location on a number line.	• Locate positive and negative whole numbers on a number line. • Locate <u>positive</u> and <u>negative</u> integers on a number line. • Compare integers using $<$, $>$, $=$.
	• The sum of an integer and its opposite is 0.	• Add and subtract positive and negative integers.
Multiplication Core Knowledge	**Students will know that:** • Place value can be used to multiply numbers with <u>factors</u> greater than two digits.	**Student will be able to:** • Multiply two factors of up to four digits each. • Solve word problems involving multiplication. • Write numbers in <u>expanded form</u> with and without using multiplication.
	• Non-exact values of given numbers can be used to make predictions and check solutions when solving problems.	• <u>Estimate</u> a <u>product</u>.
Division 5.1.1.1 5.1.1.2 5.1.1.3 5.1.1.4	**Students will know that:** • Recognize that <u>quotients</u> can be represented in a variety of ways, including a whole number with a remainder, a fraction or mixed number, or a decimal. • Number A is <u>divisible</u> by Number B when Number B can "go into" Number A without leaving a remainder. • Numbers cannot be divided by 0. • Any number divided by 1 = that number. • Place value can be used to break division problems into a simpler problem. o *189 ÷ 3 can be written: (180 ÷ 3) + (9 ÷ 3)*	**Student will be able to:** • Divide multi-digit numbers. • Divide <u>dividends</u> up to four digits by one-digit, two-digit, and three-digit <u>divisors</u>. • Solve division problems with remainders. • Check division by multiplying (and adding remainder). • Round a repeating decimal quotient.
	• Non-exact values of given numbers can be used to make predictions and check solutions when solving problems.	• Estimate quotients to arithmetic problems to assess the reasonableness of results

	• Various strategies can be used to solve real-world and mathematical problems.
	   ○ *Inverse relationships between operations*
	   ○ *Technology*
	   ○ *Context of the problem*
		• Solve real-world and mathematical problems requiring addition, subtraction, multiplication and division of multi-digit whole numbers.
		   ○ *The calculation 117 ÷ 9 = 13 can be checked by multiplying 9 and 13.*

Decimal Operations 5.1.2.1 5.1.2.5 *5.1.3.1* *(decimals)* 5.1.2.2 *5.1.3.3* *(decimals)*	**Students will know that:** • Decimals are classified and named according to greatest place value.	**Student will be able to:** • Translate a decimal between <u>standard form</u>, <u>word form</u>, and <mark><u>expanded form</u></mark>. ○ *A possible name for the number 1.5 is 15 tenths.* • Identify place value to the millionths. • <mark>Read, write, and order decimals to the nearest ten-thousandth.</mark> • <mark>Read and write decimals on a number line.</mark>

	• The value of the <u>decimal</u> place following the digit being rounded if that digit should be rounded up or remain the same.
	   ○ 2.3671 rounded to:
	     ■ *Tenths: the 6 in the hundredths place indicates that you must round the 3, in the tenths place, up to 4 and drop all following digits.*
	     ■ *Hundredths: the 7 in the thousandths place indicates that you must round the 6, in the hundredths place, to a 7 and drop all following digits.*
	     ■ *Thousandths: the 1, in the ten-thousandths place, indicates that the 7 must remain unchanged and drop all following digits.*
		• Round numbers to the nearest 0.1, 0.01, and 0.001.
		• <mark>Round decimals (and decimal <u>quotients</u>) to the nearest <u>tenth</u>, <u>hundredth</u>, and <u>thousandth</u>.</mark>

	• All decimal points and place value must be lined up in order to properly add and subtract decimal numbers.	• <mark>Simplify problems involving addition and subtraction of decimal values to the ten-thousandths.</mark> • Find 0.1 more than a number and 0.1 less than a number. • Find 0.01 more than a number and 0.01 less than a number. • Find 0.001 more than a number and 0.001 less than a number.
	• Decimal values can be used to predict the solutions of problems involving addition and subtraction of decimal values.	• <mark>Estimate sums, differences and products of decimals (by rounding)</mark> to assess the reasonableness of results.

	Students will know that:	Students will be able to:
Decimals Core Knowledge	• The product of two decimals numbers will have the same number of decimal places as the total amount of decimal places in the factors. • Multiplying any number by a power of 10 will cause the decimal point to shift to the right a specific amount of times.	• Multiply decimals by another decimal. • Multiply decimals by 10, 100, 1,000.
	• Decimals must be removed from the divisor by multiplying by a power of ten. The divided must also be multiplied by the same power of ten to keep the problem equivalent. • Dividing any number by a power of 10 will cause the decimal point to shift to the left a specific amount of times.	• Divide decimals by whole numbers and decimals. • Divide by 10, 100, or 1,000.
Fraction Operations *5.1.3.1* *(fractions)* 5.1.3.2 *5.1.3.3* *(fractions)*	**Students will know that:** • A **fraction** represents a value that is less than one. • **Equivalent** fractions can be produced by multiplying or dividing by the same value in the **numerator** and **denominator**. • A **mixed number** is a fraction and whole number combined.	**Students will be able to:** • Recognize equivalent fractions and use equivalent fractions to add and subtract fractional values. ○ $\frac{1}{2} = \frac{3}{6}$ • Determine the least common denominator (LCD) of fractions with unlike denominators. • Put fractions into lowest terms. • Compare fractions with like and unlike denominators, using the signs <, >, and =.
	• Sums and differences of fractions can be represented visually, using manipulatives or technology.	• Model sums and differences of fractions. ○ Represent $\frac{2}{3} + \frac{1}{4}$ by drawing two rectangles and shading in appropriate parts for each fraction or by using fraction circles or bars. • Add and subtract fraction with like and unlike denominators. • Add and subtract mixed number and fractions.

	• Fractional values can be used to predict the solutions of problems involving addition and subtraction of fractions.	• Estimate sums and differences of fractions to assess the reasonableness of results. • Round fractions to the nearest whole number.
	• Mixed numbers can be converted to improper fractions by multiplying the denominator by the whole number and adding the numerator to the product. This becomes the new numerator and the denominator remains the same. • When multiplying fractions, the numerator of the first fraction must be multiplied by the numerator of the second fraction; similarly for the denominators. • To find the **reciprocal** of a fraction, switch the positions of the numerator and denominator. • When dividing fractions, keep the first fraction, change the operation to multiplication and find the reciprocal of the second fraction and follow rules for multiplying fractions. • The product of a given number and its reciprocal = 1.	• Multiply mixed numbers and fractions. • Multiply and divide fractions.
	• Fractions can be written as decimals by dividing the numerator of a given fraction by the denominator.	• Write fractions as decimals. ○ $\frac{1}{4} = 0.25$; $\frac{17}{25} = 0.68$; $\frac{1}{3} = 0.3333...$ or 0.33 rounded to the nearest hundredth.
Real World Decimals and Fractions 5.1.3.4	**Students will know that:** • Decimals, fractions and mixed numbers can be used to represent situations in the real world including those involving measurement, geometry and data.	**Student will be able to:** • Solve real-world and mathematical problems. ○ *Calculate the perimeter of the soccer field when the length is 109.7 meters and the width is 73.1 meters.*

Essential Vocabulary: Real Numbers, Irrational, Rational, Integer, Whole, Natural, Equivalent, Numerator, Denominator, Simplify, Place Value, Digit, Expanded Form, Word Form, Standard Form, Sum, Difference, Quotient, Dividend, Divisor, Product, Factor, Multiple, Round, Estimate, Solution

Interim 1

Pacing Chart
Unit 1: Operations, Fractions, and Decimals

Time Frame	Topic	Suggested Activities/Assessments	Resources & Text Alignment
Week 1	Pre-assessment & Routines		
Week 1	Real Numbers		HM Course 1 11-1: Integers and Absolute Value 11-2: Comparing and Ordering Integers Integers and Rational Numbers s:/Mathematics Resources/Grade 5
Week 2 – Week 3	Division 5.1.1.1 5.1.1.2 5.1.1.3 5.1.1.4	Projects, websites, etc. Need Resources: Entire subunit – division of multi-digit	Teacher created resources, websites, etc. HM Course 1 1-1: Estimating with Whole Numbers 1-5: Methods of Computation 4-1: Divisibility
Week 3	Decimal Operations 5.1.2.1 5.1.2.5 *5.1.3.1* *(decimals)* 5.1.2.2 *5.1.3.3* *(decimals)*	Model Decimals: Hands-On Lab pg. 98	HM Course 1 3-1: Representing, Comparing, and Ordering Decimals 3-2: Estimating Decimals 3-3: Adding & Subtracting Decimals

Week 4 – Week 7	Fraction Operations *5.1.3.1* *(fractions)* 5.1.3.2 *5.1.3.3* *(fractions)*	Explore Fractions: Hands-On Lab pg. 160 Virtual Manipulative: Add Fractions with unlike denominators http://nlvm.usu.edu/en/nav/frames_asid_106_g_2_t_1.html?open.instructions	<u>HM Course 1</u> 1-2: Exponents 4-2: Factors & Prime Factorization 4-3: Greatest Common Factor 4-5: Equivalent Fractions 4-8: Adding and Subtracting Fractions with Like Denominators 4-9: Estimating Fractions, Sums and Differences 5-1: Least Common Multiple 5-2: Adding and Subtracting Fractions with Unlike Denominators 5-3: Adding and Subtracting Mixed Numbers 5-4: Regrouping to Subtract Mixed Numbers
Week 8	Real World Decimals and Fractions 5.1.3.4	Ch. 3 Real World Connection – pg. 141 Ch. 4 Real World Connection – pg. 204	<u>HM Course 1</u>
Week 9	Review		
Week 10	Interim		

Overview

Strand(s): Data Analysis

Unit 2: Number lines, Central Tendency and Data Display

Approximate Duration of Study: 8 Weeks Between Interims.

MNSS	Knowledge	Skills
Compare, Order, Locate and Plot 5.1.2.4 5.1.2.3	**Students will know that:** • Decimals, fractions, mixed numbers, improper fractions have equivalent forms. • Rational numbers have a location on the number line.	**Student will be able to:** • Compare and order decimals, fractions, mixed numbers, and improper fractions. • Locate and plot fractions, decimals on a number line.

Central Tendency
 	
5.4.1.1
	Students will know that:
	• **Measures of Central Tendency**: Mean, Median, Mode
	   ○ *Mean is the central value of a set of numbers.*
	   ○ *Median is the middle number in a data set arranged in ascending order.*
	   ○ *Mode is the number that occurs most frequently in a data set.*
	• **Measure of Dispersion**: **Range** is the value that gives information about the spread of the data.
	   ○ *Data with a large range are more spread out. Data with a small range value are less spread out.*
		Student will be able to:
		• Calculate mean, median, mode and range.
		• Use a spreadsheet to find the mean, median and range of a data set.
		• Use the mean to level out a set of data.
		   ○ *The set of numbers 1, 2, 4, 6 has mean 3. It can be leveled by taking one unit from the 4 and three units from the 6 and adding them to the 1s, making four 3s.*

Data Display 5.4.1.2	**Students will know that:** • **Data** can be displayed and interpreted using different representation; some more appropriate given the data. • The **scale** of a graph can be adjusted to accommodate rational numbers. • Spreadsheets can be used to display data. • **Coordinate Grid** is made up of a horizontal number line, the **x-axis**, and a vertical number line, the **y-axis** that intersects at one	**Student will be able to:** • Create and analyze **bar graphs**, **double-bar graphs**, and **line graphs**., **Stem-and-Leaf Plots**. • Create and analyze a line plot. • Solve problems requiring interpretation and application of graphically displayed data (i.e. word problems). • Use technology to create spreadsheet tables and graphs to organize and display data. • Plot **ordered pairs** of positive and negative whole numbers on a coordinate plane.

	point, the **origin**, and splits the plane into four equal **quadrants**. • An **Ordered Pair** is a pair of numbers that can be used to locate a point on a coordinate **plane**. • The positive **x-coordinate** is units to the right of 0, the positive **y-coordinate** is units up from 0. <mark>Combinations of whole number and integer pairs can be **plotted**</mark>	• <mark>Use a rule (simple function) or table to represent ordered pairs and plot the ordered pairs on a coordinate grid.</mark>

Essential Vocabulary: Measures of Central Tendency, Measure of Dispersion, Mean, Median, Mode, Range, Average, Ascending, Descending, Level Out, Scale, Data, Double-Bar Graph, Line Graph, Line Plot, Stem-and-Leaf Plots.

Interim 2

Pacing Chart
Unit 2: Number lines, Central Tendency and Data Display

Time Frame	Topic	Suggested Activities/Assessments	Resources & Text Alignment
Week 11 – Week 13	Compare, Order, Locate and Plot 5.1.2.4 5.1.2.3	Projects, websites, etc. Need Resources: Locate and plot rational numbers on a number line.	Teacher created, websites, etc. HM Course 1 4-4: Decimals and Fractions 4-6: Mixed Numbers and Improper Fractions 4-7: Comparing and Ordering Fractions 3-5: Multiplying Decimals *(H & A class only)*
Week 14 – Week 15	Central Tendency 5.4.1.1	Projects, websites, etc. Spinnermeania: Game Time pg. 330	Teacher created, websites, etc. HM Course 1 6-2: Mean, Median, Mode and Range
Week 16 – Week 17	Data Display 5.4.1.2	Create Bar Graphs: Technology Lab pg. 302	HM Course 1 6-1: Making a Table 6-4: Bar Graphs 6-5: Line Plots, Frequency Tables, and Histograms (Focus: Line Plots) 6-6: Ordered Pairs *(Introduction) (H & A class only)* 6-7: Line Graphs 6-9: Stem-and-Leaf Plots *(H & A class only)* 6-10: Appropriate Display *(H & A class only)*
Week 18	Review		
Week 19	Interim 2		

Overview

Strand(s): Number Operations, Algebra

Unit 3: Rational Numbers & Introduction to Algebra

Approximate Duration of Study: 9 Weeks Between Interims.

MNSS	Knowledge	Skills

Properties and PEMDAS 5.2.2.1	**Students will know that:**
	• Properties of Algebra can be used to generate equivalent **expressions.**
	• Properties of algebra can be extended to variables.
	   ○ *Commutative: $a \cdot b = b \cdot a; a + b = b + a$*
	   ○ *Associative: $(a \cdot b) \cdot c = a \cdot (b \cdot c);$*
	            $(a + b) + c = a + (b + c)$
	   ○ *Distributive: $ab - ac = a(b - c);$*
	            $ab + ac = a(b + c)$
		Student will be able to:
		• Justify procedures used to simplify algebraic and numerical expressions.
		• Explain Commutative and Associative properties over addition and multiplication.
		• Use mental computation strategies for multiplication, such as breaking a problem into partial products.
		   ○ *$3 \times 27 = (3 \times 20) + (3 \times 7) = 60 + 21 = 81$*

	• Properties of Algebra cannot be applied to all operations.	• Show that commutative and associative properties will not work over subtraction and division.
	• The **Order of Operations** dictates the order in which basic operations must be performed.	• Simplify and solve simple and multi-step problems with more than one operation • Solve word problems with multiple steps.

	• A **perfect square** is the product of two equal integers.
	• **Square Root sign: $\sqrt{\ }$**
	• Square root is the opposite of squaring a number (returns the original base value).
	   ○ **$4^2 = 16; \sqrt{16} = 4$**
	• A **power** consists of a **base** and an **exponent**.
	   ○ The exponent tells how many times to use the base as a factor.
	   ○ *"4^2" The exponent, 2, indicates that the base, 4, should be used as a factor twice: $4 \times 4 = 16$.*
		• Find perfect squares and square roots to 144.
		• Read and evaluate numerical expressions with exponents.
		• Read and evaluate numerical expressions with exponents. Using terms: **squared**, **cubed**, **to the nth power**.
		   ○ *4^2 read as "four squared"; 4^3 read as "four cubed"; both can be read as "four to the second power" and "four to the third power", respectively.*
		• Identify powers of ten up to 10^6.

	Students will know that:	Student will be able to:
Math and Verbal Form 5.2.3.2	Students will know that: • Equations and inequalities can be used to model real-world situations and vice versa.	Student will be able to: • Translate between mathematical and verbal forms of real-world situations. o *250 – 27a = b can be used to represent the number of sheets of paper remaining from a packet of 250 sheets when each student in a class of 27 is given a certain number of sheets.*
Solve, Evaluate and Simplify 5.2.3.3 5.2.3.1	Students will know that: • A value can be substituted into a **variable** for a given **expression**.	Student will be able to: • Evaluate algebraic expressions at specified values of their variables. o *What is 7 – c if c is 3.5?*
	• Inverse operations are used to isolate the variable. • The inverse of addition is subtraction, and vice versa. • The inverse of multiplication is division, and vice versa. • **Properties of Equality** are used to solve for the value of a variable. o Addition, Subtraction, Multiplication, and Division Property of Equality.	• Recognize variables and solve **equations** for the value of the given variable. • Write and solve equations for word problems.
	• An **identity** is an equation that has the same value on both sides of the equal sign. • An **equation** is true if an identity is produced after evaluation. • An **inequality** is true if a true statement is produced after evaluation.	• Determine whether an equation or inequality is true or false for a specified value of the variable.
Patterns and Plotting 5.2.1.1 5.2.1.2	Students will know that: • Patterns can be described by rules, tables, graphs, and spreadsheets.	Student will be able to: • Create a rule, table, graph or spreadsheet to represent patterns of change and solve problems.
	• **Coordinate Grid** is made up of a horizontal number line, the **x-axis**, and a vertical number line, the **y-axis** that intersects at one **point**, the **origin**, and splits the plane into four equal **quadrants**. • An **Ordered Pair** is a pair of numbers that can be used to locate a point on a coordinate **plane**. • The positive **x-coordinate** is units to the right of 0, the positive **y-coordinate** is units up from 0. • Combinations of whole number and integer pairs can be **plotted** on a coordinate grid (plane).	• Plot **ordered pairs** of positive and negative whole numbers on a coordinate plane. • Use a rule (simple function) or table to represent ordered pairs and plot the ordered pairs on a coordinate grid.

Essential Vocabulary: Mixed Numbers, Improper Fraction, Number Line, Expression, Equation, Distributive, Associative, Commutative, Variable, Inequality, Inverse Operations, Properties of Equality (Addition, Subtraction, Multiplication, Division), Identity, Order of Operations (PEMDAS), Power, Base, Exponent, Coordinate Grid, Plot, X- and Y-Axis, Point, Origin, Plane, Ordered Pair, X-Coordinate, Y-Coordinate, Quadrants, Input/Output Table.

Interim 3

Pacing Chart
Unit 3: Rational Numbers & Introduction to Algebra

Time Frame	Topic	Suggested Activities/Assessments	Resources & Text Alignment
Week 20 – Week 23	Properties and PEMDAS 5.2.2.1		HM Course 1 1-2: Exponents *(Review)* 1-3: Orders of Operations 1-4: Properties and Mental Math
Week 24 – Week 25	Math and Verbal Form 5.2.3.2 Solve, Evaluate and Simplify 5.2.3.3 5.2.3.1		HM Course 1 2-1: Variables and Expressions 2-2: Translating Between Words and Math 2-3: Translating Between Tables and Expressions 2-4: Equations and Their Solutions 2-5: Addition Equations 2-6: Subtraction Equations 2-7: Multiplication Equations 2-8: Division Equations
Week 26 – Week 27	Patterns and Plotting 5.2.1.1 5.2.1.2	Find a Pattern in Sequences: Technology Lab pg. 33 Ch. 1 Real World Connection pg. 35 Game Time: Spin a Million pg. 36 Need Resources: Research Descartes & Cartesian plane	HM Course 1 1-6: Patterns and Sequence 6-6: Ordered Pairs *(Review)* 11-3: The Coordinate Plane 13-4: Two-Step Equations *(H & A class only)* 13-5: Inequalities *(Evaluate and solve one-step only. Graph on number lines only.)*
Week 28	Review		
Week 29	Interim 3		

Unit 3

Overview

Strand(s): Geometry & Measurement, Data Analysis & Probability

Unit 4: Measurement, Geometry and Data

Approximate Duration of Study: 6 Weeks Between Interims (Teacher Discretion)

MNSS	Knowledge	Skills
Angles and Lines Core Knowledge	**Students will know that:** • A **point** is an exact position or location on a **plane**. • A point has no size or **dimensions**. • A point is named using a single upper-case letter. • A **segment** is a part of **line** that connects two points (also known as endpoints). • A **ray** is a line that begins at one endpoint and continues in another direction indefinitely. • A line is one-dimension; length and no width. • A line has no end points and continues, in either direction, indefinitely.	**Student will be able to:** • Identify and draw points, segments, rays, lines.
	• **Horizontal** lines move from left to right. • **Vertical** lines move up and down. • **Parallel** lines run side by side and never **intersect** (cross) at any point. • **Intersecting** lines cross at one point.	• Identify and draw lines: horizontal, vertical, parallel, and intersecting.

	• An **angle** is a shape formed by two intersecting lines or rays that are moving away, in different directions, from a common point.
	• Angles are measured in **degrees**.
	  ○ **Right angle** = 90°; **Acute angle**: less than 90°
	  Obtuse angle: greater than 90°; **straight angle** = 180°
	• A **protractor** is used to measure angles.
		• Measure the degrees in angles.
		• Identify and recognize angles: right, acute, obtuse and straight.

	• **Perpendicular** lines intersect at one point, creating a 90° angle.	• Identify and draw perpendicular lines.

	Students will know that:	Student will be able to:
Polygons Core Knowledge	• Triangles have exactly three sides and exactly three angles. • The sum of the angles of a triangle = 180°. • Triangles are classified according to their sides and angle measures. • Triangles are **congruent** if they have equal side measures and equal angle measures. • A **polygon** is a two-dimensional figure with *at least* three sides and three angles. • **Regular** polygons have sides of equal length and angles of equal measure.	• Identify and construct different triangles: **equilateral**; **right**; and **isosceles**. • Identify congruent triangles. • Identify **triangle**, **quadrilateral**, **pentagon**, **hexagon**, and **octagon**. • Identify **parallelogram**, **trapezoid**, **rhombus**, **rectangle**, and **square**. • Identify and draw **diagonals** of polygons.

Area
5.3.2.1
	Students will know that:
	• **Area** applies to **two-dimensional figures**.
	• Area is measured in **square units**.
	• Area represents the number of square units needed to cover a given surface.
	• Specific two-dimensional figures have **formulas** for calculating area.
	• Area formulas can be derived by composing/decomposing two-dimensional figures.
		Student will be able to:
		• Develop and use formulas to solve for the area of polygons.
		   ○ Area of Triangle: $\frac{1}{2}bh$
		   ○ Area of Parallelogram: bh
		   ○ Area of Rectangle: LW
		   ○ Area of Square: s^2
		   ○ Area of Trapezoid: $\frac{1}{2}h(b_1 + b_2)$
		• Find the area of an **irregular figure** by dividing into **regular figures**.
		   ○ *A trapezoid can be divide into 2 triangles and a rectangle.*
		• Solve problems involving finding area in a variety of square units.
		   ○ mi^2; yd^2; ft^2; in^2; km^2; m^2; cm^2; mm^2

3-D Classifications 5.3.1.1	**Students will know that:** • Three-Dimensional shapes are classified according to the number of edges, faces (also types of faces), and vertices.	**Student will be able to:** • Describe and classify three-dimensional figures.
Nets 5.3.1.2	**Students will know that:** • A net is a two-dimensional representation that can folded to make a three-dimensional figures.	**Student will be able to:** • Recognize and draw a net for a three-dimensional figure.

Volume and Surface Area
5.3.2.2
5.3.2.3
	Students will know that:
	• Volume applies to three-dimensional figures.
	  Volume is measured in cubic units.
	• Volume represents the number of cubic units needed to fill a given space (capacity).
	• Volume can be found by counting the total number of same-sized cubic units that fill a shape without gaps or overlaps.
		Student will be able to:
		• Measure the volume of three-dimensional figures represented by real-world objects.
		• Use formal and informal methods to find the volume of three-dimensional figures.
		  o *Ruler, string, nets, counting cubes, etc.*

	• The **surface area** of a solid is equal to the area of its net.	• Measure the surface area of three-dimensional figures represented by real-world objects.
		• Use formal and informal methods to find the surface area of three-dimensional figures.
		  o *Ruler, string, nets, etc.*
		• Calculate the surface area of a rectangular prism.
		  o *Formula: 2lw + 2lh + 2hw where l, w, h represent length, width, and height of the prism.*

Volume Formula
5.3.2.4
	Students will know that:
	• Volume of rectangular prisms can be derived by breaking the prism into layers of unit cubes.
	• Specific three-dimensional figures have formulas for calculating volume.
		Student will be able to:
		• Develop and use formulas to solve for the volume of a rectangular prism.
		  o *Volume of Rectangular Prism: LWH*
		• Solve problems involving finding volume in **cubic units**
		  o *cm^3; in^3*

Measurement
 	
Core Knowledge
	Students will know that:
	• **Conversion factors** can be used to move from one unit of measure to an equivalent measure of a different unit.
	  o *Using the conversion factor 3 feet = 1 yard and 12 inches = 1 foot, the number of inches can be found in 3.5 yards.*
		Student will be able to:
		• Convert to common **units** in problems involving addition and subtraction of different units.
		  o *3 ft – 15 in = 36 in – 15 in = 21 in or 1 ft 9 in.*

	• Time is measured linearly.	• Solve problems involving elapsed time. • Regroup when multiplying and dividing amounts of time.

Circles & Circle Graphs Core Knowledge	**Students will know that:** • A **circle** is a line forming a closed loop; every point on the line is of equal distance from the center point. • The **diameter** is the distance across a circle, through its center point. • **Radius** is half of the diameter (distance from center point to a point on the circle). • An **arc** is a small portion of the circumference of a circle. • A **chord** is any line that connects two points on a circle. • A **compass** is used to draw circles. • **Circumference** is the distance around (perimeter) a circle. • *Pi "π" ≈ 3.14)*	**Student will be able to:** • Identify arc, chord, radius (radii), and diameter. • Use a compass to draw circles with a given diameter or radius. • Find the circumference of a circle using appropriate formulas. ○ *Circumference = πd, and C = 2πr*
Probability Core Knowledge	**Students will know that:** • **Probability** measures the likelihood that an **event** will occur. • Probability can be expressed as a fraction, decimal, or percent. • The closer the probability is to 1, the more likely it is that the event will occur. The closer the probability is to 0, the less likely it is that the event will occur.	**Student will be able to:** • Determine probability of simple events. • Express probability of a given event as a fraction, percent and decimal between 0 and 1.

Essential Vocabulary: Quadrilateral, Parallelogram, Triangle, Square, Rectangle, Trapezoid, Rhombus, Area, Surface Area, Volume, Rectangular Prisms, Edges, Faces, Vertex, Polygon, 2-Dimension, 3-Dimension, Polyhedron, Base, Height, Length, Width, Prisms, Pyramids, Cylinders, Cones, Cube, units^2, units^3, Formula (Area, Volume, Surface Area), Net, Figure

Interim 4

Pacing Chart
Unit 4: Measurement, Geometry and Data

Time Frame	Topic	Suggested Activities/Assessments	Resources & Text Alignment
	Angles and Lines Core Knowledge		Teacher created, websites, etc. <u>HM Course 1</u> 8-2: Measuring and Classifying Angles 8-4: Classifying Pairs of Lines 8-6: Quadrilaterals
	Polygons Core Knowledge		<u>HM Course 1</u> 8-7: Polygons 9-7: Perimeter
	Area 5.3.2.1	Need resources: nets	<u>HM Course 1</u> 10-1: Area of Rectangles and Parallelograms 10-2: Area of Triangles & Trapezoids 10-3: Area of Composite Figures 8-8: Geometric Patterns
Week 32	Mathematics MCAS		
	3-D Classifications 5.3.1.1	Explore Volume of Prisms: Hands-On Lab pg. 564	<u>HM Course 1</u> 10-6: Three-Dimensional Figures
	Nets 5.3.1.2	Model Three-Dimensional Figures: Hands-On Lab pg. 574	
	Volume and Surface Area 5.3.2.2 5.3.2.3		<u>HM Course 1</u> 10-9: Surface Area
	Volume Formula 5.3.2.4		<u>HM Course 1</u> 10-7: Volume of Prisms
	Measurement		<u>HM Course 1</u> 9-1: Understanding Customary Units of Measure

	Core Knowledge		9-2: Understanding Metric Units of Measure 9-5: Time and Temperature
	Circles & Circle Graphs Core Knowledge		<u>HM Course 1</u> 9-8: Circles and Circumference 10-5: Area of Circles
Optional	Optional Core Knowledge		<u>HM Course 1</u> 7-7: Percents 5-7: Multiplying Fractions 5-8: Multiplying Mixed Numbers 5-9: Dividing Fractions and Mixed Numbers
	Probability Core Knowledge		<u>HM Course 1</u> 12-1: Introduction to Probability 12-2: Experimental Probability 12-3: Theoretical Probability
Week 35	Review		
Week 36	Interim 4		