Diocese of Raleigh
Catholic Schools

7200 Stonehenge Drive

Raleigh, NC 27613

www.dioceseofraleigh.org

K-8 Math Standards
Diocese of Raleigh

May 2018

THE DIOCESE OF RALEIGH SCHOOLS:
MISSION OF OUR CATHOLIC SCHOOLS

The mission of the Diocese of Raleigh is to engage our school/preschool communities in creating a quality education within a Catholic environment that fosters the current and future development of the whole child.

DIOCESE OF RALEIGH CATHOLIC SCHOOLS: A FOUNDATION FOR LIFE

"School is one of the educational environments where one grows by learning how to live, how to become grown- up, mature men and women...Following what St. Ignatius teaches us, the main element in school is learning to be magnanimous...This means having a big heart, having a greatness of soul. It means having grand ideals, the desire to achieve great things in response to what God asks of us and, precisely because of this, doing everyday things, all our daily actions, commitments, and meetings with people well. [It means] doing the little everyday things with a big heart that is open to God and to others." Pope Francis *{Excerpts from Pope Francis: Speech address on June 7, 2013 on the importance of Catholic education in schools in Italy and Albania in the Paul VI Audience Hall.}*

Math
Philosophy

Mathematics reflects the order and unity in God's universe. Our society depends upon the use of Science, Technology, Religion, Engineering, Art and Math. It relies upon a mathematical knowledge which assists students in developing the ability to reason, think critically, and logically. All students will develop practical tools for daily living and the ability to discover creative ways to solve problems.

Standards for Mathematical Practice

1. Analyze problems critically and persevere in solving them.	**5. Use both tactile and technological tools appropriately.**
2. Understand relationships between real-life situations and mathematical symbols.	**6. Attend to detail and precision.**
3. Construct viable arguments and critique the reasoning of others.	**7. Seek and make use of patterns and repeated reasoning.**
4. Model with mathematics using a variety of methods.	**8. Justify reasoning and solutions.**

INTRODUCTION

The following mathematical standards are intended for use in all Diocese of Raleigh Catholic elementary and middle schools. All students should have the opportunity and the support necessary to learn significant mathematics with depth and understanding whereby ideas are linked to and build on one another so students' understanding and knowledge deepen and their ability to apply mathematics expands. Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well. They must learn mathematics with understanding, actively building new knowledge from experience and previous knowledge. Assessments should support the learning of important mathematics and furnish useful information to both teachers and students.

STRUCTURE
Overarching Standards
Achievement Standards
Grade Level Goals

Overarching Standards

Counting and Cardinality [CC]

Operations and Algebraic Thinking [OA]

Number and Operations in Base Ten [NBT]

Number and Operations - Fractions [NF]

Measurement and Data [MD]

Geometry [G]

Ratio and Proportional Relationships [RP]

The Number System [NS]

Expressions and Equations [EE]

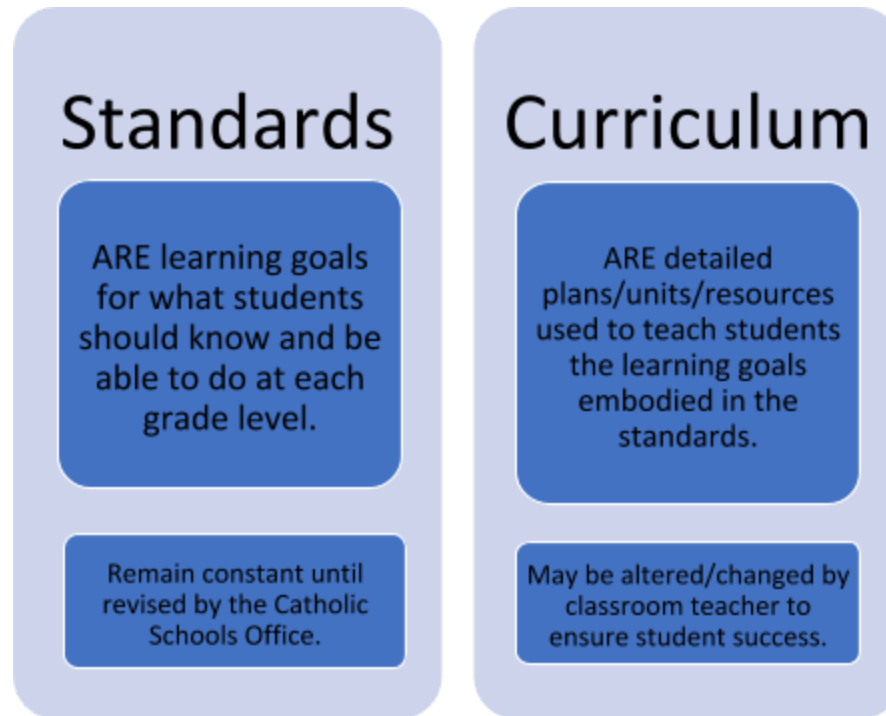Statistics and probability [SP]

Functions [F]

SAMPLE

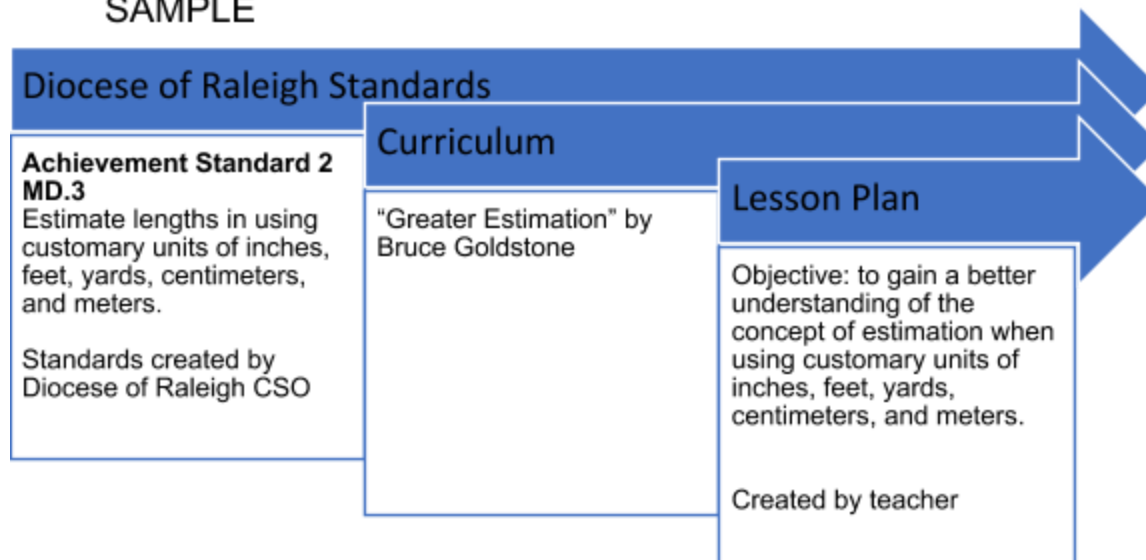| Counting and Cardinality		Overarching Standard
Achievement Standard: K.CC 1 Know number names and the counting sequence.		Achievement Standard
K.CC 1.1	Know number names and recognize patterns in the counting sequence by: • Counting to 100 by ones. • Counting to 100 by tens.	Goals
K.CC 1.2	Count…….	
K.CC 1.3	Write numbers……..	

DOR Standards aligned with the North Carolina Standard Course of Study K-8 Mathematics adopted June 2017

Curriculum Revision Team

Melissa Ellis, Cathedral School	Kathleen Weeks, Immaculata Catholic School
Susan Kirkpatrick, Our Lady of Lourdes Catholic School	Kristine Fiala, St. Catherine of Siena Catholic School
Kyla Elmore, St. Mark Catholic School	Dee Schmid, St. Mark Catholic School
Carmen Boyd, St. Mary Magdalene Catholic School	Marianne Bohinski, St. Michael the Archangel Catholic School
Cindy Gay, St. Michael the Archangel Catholic School	Kylie Sciba, St. Paul Catholic School
Patty Angolia, St. Peter Catholic School	Maria Faison, St. Thomas More Catholic School
Fran Franks, The Franciscan School	Tom Harmon, The Franciscan School
Claire Wittmeier, The Franciscan School	Kimberly Browning, Assistant Superintendent
Linda Riley, St. Catherine of Siena Catholic School	

Sixth Grade

Ratio and Proportional Relationships	
Achievement Standard: 6.RP.1 Understand ratio concepts and use ratio reasoning to solve problems.	
6.RP.1.1	Understand the concept of a ratio and use ratio language to describe and model the relationship between two quantities.
6.RP.1.2	Understand that ratios (a:b) can be expressed as equivalent unit rates (a/b with b=1) by finding and interpreting both unit ratios in context.
6.RP.1.3	Use ratio reasoning with equivalent whole number ratios to solve real world and mathematical problems. ● Create and use tables to compare ratios. ● Plot ordered pairs on the coordinate plane. ● Find missing values in equivalent ratio tables. ● Convert and manipulate measurements using given ratios. ● Solve unit rate problems including those involving unit pricing and constant speed.
6.RP.1.4	Use ratio reasoning to solve real world and mathematical problems with percents. ● Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, finding the part, and finding the percentage, given the other two values. ● Use equivalent ratios, such as benchmark percentages (50%, 25%, 10%, 5%, 1%) to determine a part of any given quantity. ● Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. ● Convert within customary and metric systems using ratios.

The Number System
Achievement Standard: 6.NS.1 Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

6.NS.1.1	Use visual models and word problems to: ● Interpret and compute products and quotients of fractions. ● Solve real-world problems using multiplication and division of fractions.

Achievement Standard: 6.NS.2 Compute fluently with multi-digit numbers and find common factors and multiples.

6.NS.2.1	Fluently divide using long division, with a minimum of a four-digit dividend and interpreting the quotient and remainder.
6.NS.2.2	Apply and extend previous understanding of decimals to develop and fluently use the standard algorithms for addition, subtraction, multiplication, and division of decimals.
6.NS.2.3	Understand and use prime factorization and the relationships between factors to: ● Find the unique prime factorization for a whole number. ● Find the GCF of two whole numbers up to 100. ● Use the GCF and the distributive property to express a sum of two whole numbers up to 100. ● Find the LCM of two whole numbers less than or equal to 12 to add and subtract fractions with unlike denominators. ● Use the divisibility rules of 4 and 6.

Achievement Standard: 6.NS.3 Apply and extend previous understandings of numbers to the system of rational numbers.

6.NS.3.1	Understand and use rational numbers to:
	● Describe positive and negative quantities having opposite directions or values.
	● Represent positive and negative numbers in real-world contexts, explaining the meaning of zero in each situation.
	● Understand the absolute value of a rational number as its distance from zero on the number line.
	    ○ Interpret absolute value as magnitude for a positive or negative quantity in real-world contexts.
	    ○ Distinguish comparisons of absolute value from statements about order.

6.NS.3.2	Understand rational numbers as points on the number line and as ordered pairs on a coordinate plane. ● Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. ● Recognize opposite signs of numbers as indicating locations on opposite sides of zero on the number line. ● Recognize that the opposite of the opposite of a number is the number itself.

	● Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. ● Find and position integers and other rational numbers on a horizontal number line, or vertical number line, and coordinate plane.
6.NS.3.3	Understand ordering of rational numbers. ● Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. ● Write, interpret, and explain statements of order for rational numbers in real-world contexts.
6.NS.3.4	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. ● Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

6.NS.3.5	Apply and extend previous understanding of addition and subtraction.
	● Understand additive inverses when adding and subtracting integers.
	   ○ Describe real-world contexts in which opposite quantities combine to make zero (zero pair).
	   ○ Use models to add and subtract integers from -20 to 20 and describe real-world contexts using sums and differences.
	   ○ Understand subtraction of integers as adding the additive inverse.
	   ○ Show that the distance between two integers is the absolute value of their difference.

6.NS.3.6	Apply and extend previous understanding of multiplication and division. ● Solve multiplication and division problems that use positive and negative integers. ● Solve problems using a combination of all four operations with positive and negative integers.

Expressions and Equations	
Achievement Standard: 6.EE.1 Apply and extend previous understandings of arithmetic to algebraic expressions.	
6.EE.1.1	Write and evaluate numerical expressions, with and without grouping symbols, involving whole number exponents.
6.EE.1.2	Write, read, and evaluate algebraic expressions. ● Write expressions that record operations with numbers and with letters standing for numbers. ● Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, and coefficient) and view one or more of those parts as a single entity. ● Evaluate expressions with specific values for their variables, including expressions that arise from formulas used in real-world problems.

6.EE.1.3	Apply the properties of operations to generate equivalent expressions with and without exponents.
6.EE.1.4	Identify when two expressions are equivalent and justify with mathematical reasoning.

Achievement Standard: 6.EE.2 Reason about and solve one-variable equations and inequalities.	
6.EE.2.1	Use substitution to determine whether a given number in a specified set makes an equation true.
6.EE.2.2	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem.
6.EE.2.3	Solve real-world and mathematical problems by writing and solving one-step equations.
6.EE.2.4	Understand and solve inequalities. ● Use substitution to determine whether a given number in a specified set makes an inequality true. ● Write an inequality to represent a constraint or condition in a real-world or mathematical problem. ● Recognize that inequalities have infinitely many solutions. ● Represent solutions of such inequalities on number line diagrams.

Achievement Standard: 6.EE.3 Represent and analyze quantitative relationships between dependent and independent variables.	
6.EE.3.1	Represent, understand, and analyze quantitative relationships by: ● Use variables to represent two quantities in a real-world problem that change in relationship to one another. ● Analyze the relationship between quantities in different representations (context, equations, tables, and graphs).

Geometry	
Achievement Standard: 6.G.1 Solve real-world and mathematical problems involving area, surface area, and volume.	
6.G.1.1	Create geometric models to: ● Find the area of triangles by composing into rectangles and decomposing into right triangles. ● Find the area of special quadrilaterals and polygons by decomposing into triangles and rectangles. ● Know and apply formulas (perimeter and area) for triangles and quadrilaterals.
6.G.1.2	Find the volume of a right rectangular prism. ● Know and apply formulas $V = lwh$ and $V = Bh$. ● Find volumes with fractional edge lengths. ● Solve real-world and mathematical problems.
6.G.1.3	Use the coordinate plane to solve real-world and mathematical problems. ● Draw polygons in the coordinate plane given coordinates for vertices. ● Use coordinates to find the length of a side joining points with the same first coordinate or same second coordinate.

6.G.1.4	Represent right prisms and right pyramids by: ● Using the nets of rectangles and triangles. ● Using the nets to find the surface area of these figures. ● Applying these techniques in the context of solving real-world and mathematical problems.
6.G.1.5	Investigate relationships between lines and angles.

Statistics and Probability	
Achievement Standard: 6.SP.1 Develop an understanding of statistical variability.	
6.SP.1.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
6.SP.1.2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
6.SP.1.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. ● Mean-measure of center that represents a balance point or fair share; can be influenced by extreme measures. ● Median-measure of center that is the numerical middle of an ordered data set. ● Describing the variability of a data set is necessary to distinguish between data sets in the same scale, by comparing graphical representations of different data sets in the same scale that have similar measures of center, but different spreads.

Achievement Standard: 6.SP.2 Use data samples of a population and describe the characteristics and limitations of the samples.	
6.SP.2.1	Display and compare numerical data sets in a variety of ways including dot plots (line plots), box plots, and histograms.
6.SP.2.2	Sketch circle graphs.
6.SP.2.3	Summarize data sets in relation to their context by: ● Reporting the number of observations in dot plots and histograms. ● Describing the nature of the attribute under investigation, including how it was measured and the units of measurement. ● Giving quantitative measures of central tendency, as well as describing any overall pattern and any striking deviations from the overall pattern, to analyze center and variability. ● Justifying the appropriate choice of measures of center using the shape of the data distribution.