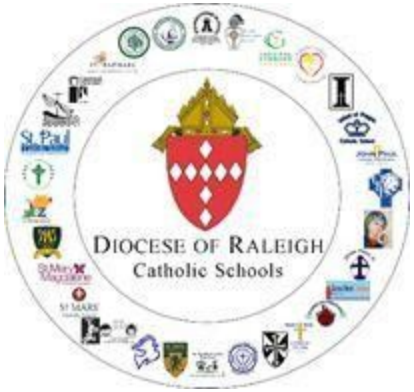

Diocese of Raleigh
Catholic Schools
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K-8 Math Standards
Diocese of Raleigh

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.

PREFACE

These guidelines contain four levels of standards:

Kindergarten - Grade 2

Grade 3 - Grade 4

Grade 5 - Grade 6

Grade 7 - Grade 8

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

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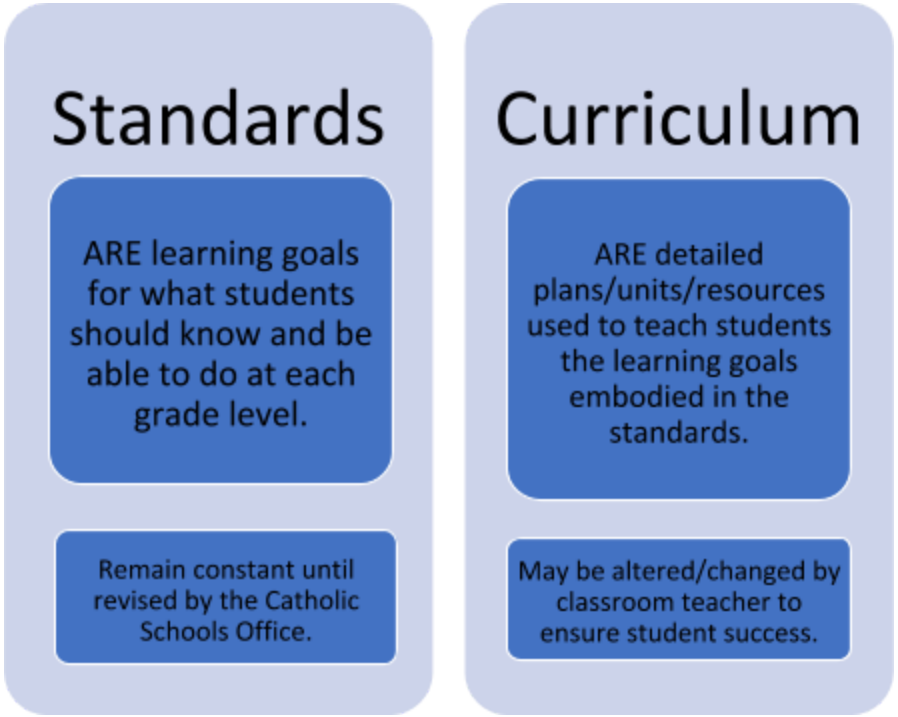
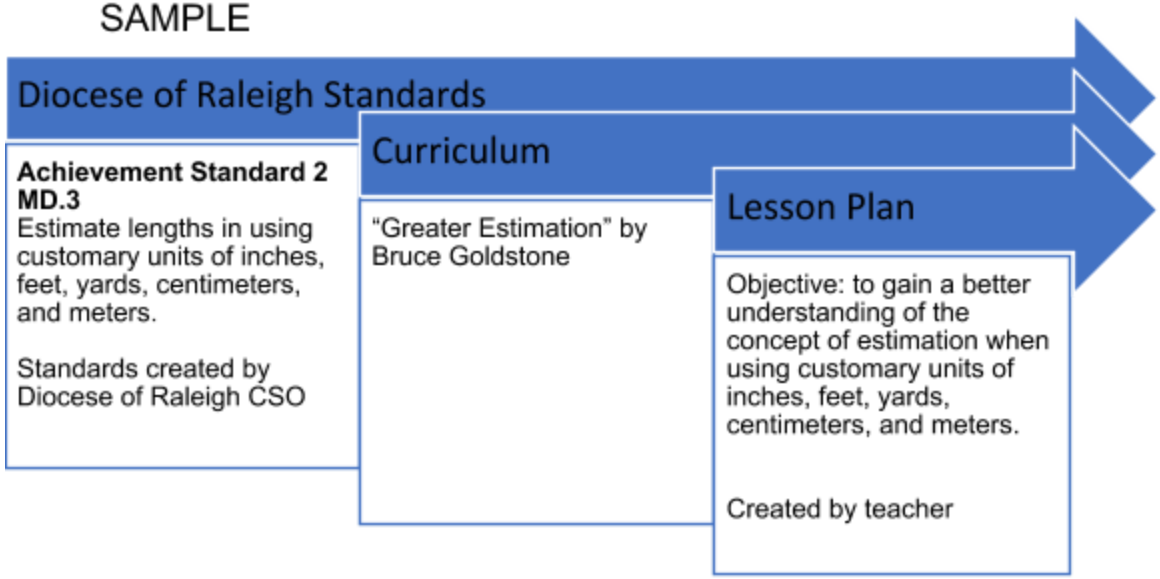

Standards
ARE learning goals for what students should know and be able to do at each grade level.
Remain constant until revised by the Catholic Schools Office.
Curriculum
ARE detailed plans/units/resources used to teach students the learning goals embodied in the standards.
May be altered/changed by classroom teacher to ensure student success.

SAMPLE


Diocese of Raleigh Standards
Curriculum
Lesson Plan
Achievement Standard 2 MD.3
Estimate lengths in using customary units of inches, feet, yards, centimeters, and meters.
Standards created by Diocese of Raleigh CSO
"Greater Estimation" by Bruce Goldstone
Objective: to gain a better understanding of the concept of estimation when using customary units of inches, feet, yards, centimeters, and meters.
Created by teacher

Fourth Grade

Operations and Algebraic Thinking	
Achievement Standard: 4.OA.1 Represent and solve problems involving multiplication and division.	
4.OA.1.1	Interpret multiplication equations as multiplicative comparisons. ● Multiply or divide to solve word problems involving multiplicative comparisons using models and equations with a symbol for the unknown number. ● Assess the reasonableness of answers using mental computation, estimation strategies, and rounding. ● Distinguish multiplicative comparisons from additive comparisons.

Achievement Standard: 4.OA.2 Use the four operations with whole numbers to solve problems.	
4.OA.2.1	Solve two-step word problems involving the four operations with whole numbers. ● Use estimation strategies to assess reasonableness of answers. ● Apply commutative, distributive, associative and identity properties. ● Understand and interpret remainders of word problems. ● Represent problems using equations with a letter standing for the unknown quantity.

Achievement Standard: 4.OA.3 Gain familiarity with factors and multiples.	
4.OA.3.1	Find all factor pairs for whole numbers up to and including 144. ● Recognize that a whole number is a multiple of each of its factors. ● Determine if a given whole number is a multiple of a given one-digit number. ● Define and understand prime and composite numbers.

Achievement Standard: 4.OA.4 Generate and analyze patterns.	
4.OA.4.1	Generate and analyze a number, letter or shape pattern that follows a given rule. ● Identify apparent features of the pattern that were not explicit in the rule, itself. ● Explain why the numbers, letters or shape patterns will continue to alternate in this way.

Number and Operations in Base Ten	
Achievement Standard: 4.NBT.1 Generalize place value understanding for multi-digit numbers whole numbers and decimals.	
4.NBT.1.1	Explain that in a multi-digit whole number and a decimal number, a digit in the one's place represents 10 times as much as it represents in the place to its right, up to the hundredth thousands and to the hundredths.
4.NBT.1.2	Read and write multi-digit whole numbers up to and including 100,000 using numerals, word and expanded form.
4.NBT.1.3	Compare and order multi-digit numbers up to and including 100,000 based on the value of the digits in each place, using <, >, and = symbols to record the results of comparisons. ● Use place value understanding to round multi-digit whole numbers to any place.

Achievement Standard: 4.NBT.2 Use place value understanding and properties of operations to perform multi-digit algorithms.	
4.NBT.2.1	Fluently add and subtract multi-digit whole numbers up to and including 100,000 using the standard algorithm with place value understanding.
4.NBT.2.2	Multiply a whole number of up to four digits by a one-digit whole number, and multiply up to two-digit numbers, using strategies based on place value, area models, partial products, and properties of operation.
4.NBT.2.3	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors using strategies based on place value, rectangular arrays, area models, repeated subtraction, partial quotients, properties of operations, and/or relationship between multiplication and division.

Number and Operations - Fractions	
Achievement Standard: 4.NF.1 Extend understanding of fraction equivalence and ordering.	
4.NF.1.1	Explain why a fraction is equivalent to another fraction by using a fraction models (area and length), with focus on how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
4.NF.1.2	Compare two fractions with different numerators and different denominators, using 2, 3, 4, 5, 6, 8, 10, 12, and 100 as denominators. Understand that the comparisons are valid only when the two fractions refer to the same whole number. Use the symbols <, >, and = to record results and justify conclusions by: ● Reasoning about their size ● Using benchmark fractions 0, ½, and a whole ● Comparing common numerator or common denominator.

Achievement Standard: 4.NF.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	
4.NF.2.1	Understand and justify decompositions of fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100. ● Understand addition and subtraction of fractions as complete and/or separate parts, referring to the same whole or group. ● Decompose a fraction into a sum of unit fractions and a sum of fractions with the same denominator in more than one way using area and length models and equations. ● Add, subtract, multiply and divide fractions and mixed numbers with like and remove denominators. Replace mixed numbers with equivalent fractions, using properties of operations and the relationship between addition and subtraction. ● Solve word problems involving addition and subtraction of fractions and mixed numbers by using a visual representation of the problems and writing equations.

Achievement Standard: 4.NF.3 Use unit fractions to understand operations of fractions.	
4.NF.3.1	Apply and extend previous understanding of multiplication to: ● Explain and model the representation of fractions by multiplying a whole number by a unit fraction. ● Solve word problems involving multiplication of a fraction by a whole number.

Achievement Standard: 4.NF.4 Understand decimal notation for fractions, and compare decimals and fractions.	
4.NF.4.1	Use decimal notation to represent fractions: ● Express, model and explain the equivalence of fractions with a denominator of 10 with fractions with a denominator of 100. ● Use equivalent fractions to add fractions with denominators of 10 and 100. ● Use decimal notation for fractions with denominators 10 or 100. ● Use tenths and hundredths models to make connections between fractions and decimals.
4.NF.4.2	Compare two decimals to hundredths by reasoning about their size. Record the results of comparisons with the symbols <, >, and = and justify conclusions with visual models. ● Recognize that comparisons are valid only when the two decimals refer to the same whole. ● Estimate and compute sum or difference of whole numbers with decimals, and decimals with decimals.

Measurement and Data	
Achievement Standard: 4.MD.1 Solve problems involving measurement	
4.MD.1.1	Know relative sizes of measurement units. ● Solve problems by using customary and metric systems of measurement. ● Measure to solve problems involving systems of units including km, m, cm; kg, g; lb, oz.; hr, min, sec. ● Use the four operations to solve one-step word problems involving whole-number measurements of length, mass, and capacity which are given in customary and metric units.
4.MD.1.2	Use multiplicative reasoning to convert customary and metric measurements from a larger unit to a smaller unit using place value understanding, two-column tables, number line diagrams and modeling.
4.MD.1.3	Solve word problems involving distances, masses of objects, and money, including problems involving simple fractions or decimals, and problems that involve addition and subtraction of time intervals that cross the hour.

Achievement Standard: 4.MD.2 Solve problems involving area and perimeter.	
4.MD.2.1	Solve problems involving a fixed area and varying perimeters, and a fixed perimeter and varying areas. ● Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. ● Find areas of rectilinear figures with known side lengths.

Achievement Standard: 4.MD.3 Represent and interpret data.	
4.MD.3.1	Represent and interpret data using whole numbers. ● Collect data by asking questions which yield numerical data. ● Create a frequency table, scaled bar graph and/or a dot plot (line plot) to show a representation of data and interpretation of a data set of measurements in fractions of a unit (½,¼, ⅛). ● Solve problems involving addition and subtraction of fractions by using information presented in a dot plot (line plot). ● Determine whether a survey question will yield categorical or numerical data. ● Introduce measures of central tendency (range, median, mean, and mode).

Geometry	
Achievement Standard: 4.G.1 Classify two and three-dimensional shapes based on lines, angles, faces, edges and vertices.	
4.G.1.1	Define, identify and draw points, lines, line segments, rays, angles (right, acute, obtuse), perpendicular and parallel lines.
4.G.1.2	Classify quadrilaterals and triangles by their angle measurements, side lengths, and the presence or absence of parallel or perpendicular lines, and two and three-dimensional figures by their specific size and shape. ● Identify intersecting, parallel, and perpendicular lines and line segments and their midpoints: identify in the environment. ● Understand the concept of similarity and congruence. ● Recognize congruent plane figures after geometric transformations, such as rotations (turns), reflections (flips), and translations (slides). ● Classify quadrilaterals and triangles by their angles and sides. ● Classify attributes of three-dimensional solid figures including the faces, edges and vertices of cubes, cylinders, cones, spheres, rectangular and triangular prisms and pyramids.
4.G.1.3	Recognize, identify, and draw the line of symmetry in line-symmetric figures.
Achievement Standard: 4.G.2 Understand concepts of angles and measure angles.	
4.G.2.1	Develop an understanding of angles and angle measurement. ● Understand angles are measured by degrees and are formed by two rays sharing a common endpoint. ● Create geometric shapes. ● Accurately measure in whole-number degrees, and draw angles using a protractor. ● Use addition and/subtraction to find unknown angles on a diagram in real-world and mathematical problems.