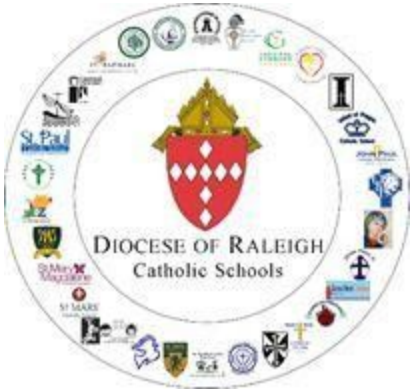


Diocese of Raleigh
Catholic Schools
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# K-8 Math Standards
# Diocese of Raleigh

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

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|---|---|
| **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:<br>• Counting to 100 by ones.<br>• 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**

| | |
|---|---|
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| Kyla Elmore, St. Mark Catholic School | Dee Schmid, St. Mark Catholic School |
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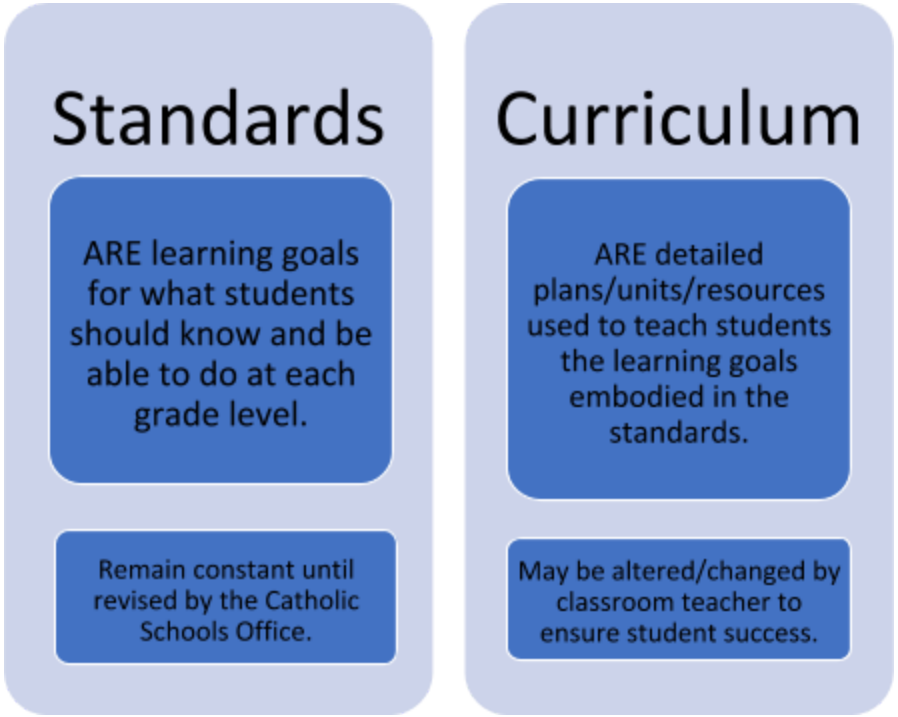
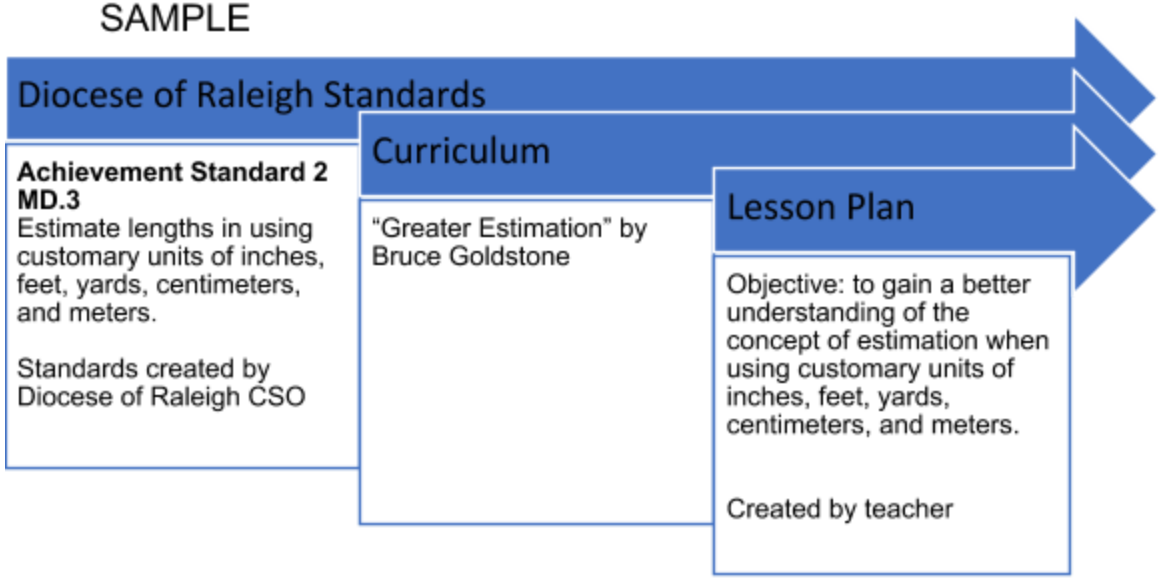

Standards
ARE learning goals for what students should know and be able to do at each grade level.
Remain constant until revised by the Catholic Schools Office.
Curriculum
ARE detailed plans/units/resources used to teach students the learning goals embodied in the standards.
May be altered/changed by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

# Fifth Grade

| Operations and Algebraic Thinking | |
|---|---|
| Achievement Standard: 5.OA.1 Write and interpret numerical expressions. | |
| 5.OA.1.1 | Write, explain, and evaluate numerical expressions involving the four operations to solve up to two-step problems. Include expressions involving: |
| | ● Brackets and parentheses, using the order of operations. |
| | ● Commutative, associative, distributive, and identity properties. |

| Achievement Standard: 5.OA.2 Analyze patterns and relationships. | |
|---|---|
| 5.OA.2.1 | Given a set of numbers analyze the pattern and state the rule. |
| | ● Use models to represent variables, expressions, and relationships. |
| | ● Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms.<br>● Form ordered pairs consisting of corresponding terms from the two patterns.<br>● Graph the ordered pairs on a coordinate plane. |
| | ● Investigate patterns that occur when changing numerators or denominators of fractions. Model with concrete materials. |
| | ● Use organized and appropriate strategies to solve multi-step problems involving patterns, relationships, and functions. |

| Number and Operations in Base Ten | |
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| Achievement Standard: 5.NBT.1 Understand the place value system from the hundred millions place to the thousandths place. | |
| 5.NBT.1.1 | Explain the patterns in the place value system from the hundred millions place to the thousandths place. |
| | ● Explain that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.<br>● Explain patterns in products and quotients when numbers are multiplied by 1,000, 100, 10, 0.1, and /or divided by 10 and 100. |
| 5.NBT.1.2 | Read, write, order, round**,** and compare decimals to thousandths. |
| | ● Write decimals using base-ten numerals, number names,word form**,** and expanded form. |
| | ● Compare two decimals to thousandths 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 decimals to any place in real life situations. |

| Achievement Standard: 5.NBT.2 Perform operations with multi-digit whole numbers. | |
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| 5.NBT.2.1 | Demonstrate fluency with the multiplication of two whole numbers up to a three digit number by a two digit number using the standard algorithm.<br>● Use estimation strategies to assess reasonableness of answers. |
| 5.NBT.2.2 | Find quotients with remainders when dividing whole numbers with up to four-digit dividends and two digit divisors using rectangular arrays, area models, repeated subtraction, partial quotients, and/or the relationship between multiplication and division. Use models to make connections and develop the algorithm. |

| Achievement Standard: 5.NBT.3 Perform operations with decimals. | |
|---|---|
| 5.NBT.3.1 | Compute and solve real-world problems with multi-digit whole numbers and decimal numbers. |
| | ● Add and subtract decimals to thousandths using models, drawings, or strategies based on place value. |
| | ● Multiply decimals with a product to thousandths using models, drawings, or strategies based on place value. |
| | ● Divide a whole number by a decimal and divide a decimal by a whole number, using repeated subtraction or area models. Decimals should be limited to hundredths. |
| | ● Use estimation strategies to assess reasonableness of answers. |

| **Number and Operations - Fractions** | |
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| Achievement Standard: 5.NF.1 Use equivalent fractions as a strategy to add and subtract fractions. | |
| 5.NF.1.1 | Add and subtract fractions, including mixed numbers with unlike denominators using related fractions: halves, fourths, and eighths; thirds, sixths, and twelfths; fifths, tenths, and hundredths. |
| | ● Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. |
| | ● Solve one and two-step word problems in context using area and length models to develop the algorithm. Represent the word problem in an equation. |

| Number and Operations - Fractions | |
|---|---|
| Achievement Standard: 5.NF.2 Apply and extend previous understandings of multiplication and division to multiply and divide fractions. | |
| 5.NF.2.1 | Use fractions to model and solve division problems.<br>● Interpret a fraction as an equal sharing context, where a quantity is divided into equal parts.<br>● Model and interpret a fraction as the division of the numerator by the denominator.<br>● Solve word problems involving division of whole numbers leading to answers in the form of fractions and mixed numbers, with denominators of 2, 3, 4, 5, 6, 8, 10, and 12, using area, length, and set models or equations. |
| 5.NF.2.2 | Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction, including mixed numbers.<br>● Use area and length models to multiply two fractions, with the denominators 2, 3, & 4.<br>● Explain why multiplying a given number greater than 1 results in a product greater than the given number and when multiplying a given number by a fraction less than 1 results in a product smaller than the given number.<br>● Solve one-step word problems involving multiplication of fractions using models to develop the algorithm. |
| 5.NF.2.3 | Solve one-step word problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions using area and length models, and equations to represent the problem. |
| 5.NF.2.4 | Gain familiarity with factors and multiples. |
| | ● Identify the greatest common factor<br>● Identify the least common multiple<br>● Use divisibility rules for 2, 3, 5, 9, and 10<br>● Identify prime and composite numbers. |

| Measurement and Data | |
|---|---|
| Achievement Standard: 5.MD.1 Convert like measurement units within a given measurement system. | |
| 5.MD.1.1 | Given a conversion chart, use multiplicative reasoning to solve one-step conversion problems with a given measurement system.<br>● Understand the need for measuring and estimating with standard units in both the customary and metric systems.<br>● Carry out simple unit conversions, such as from centimeters to meters, within a system of measurement. |

| Achievement Standard: 5.MD.2 Represent and interpret data. | |
|---|---|
| 5.MD.2.1 | Represent and interpret data. |
| | ● Collect data by asking a question that yields data that changes over time. |
| | ● Make and interpret a representation of data using a line graph and dot (line) plot. |
| | ● Determine whether a survey question will yield categorical or numerical data, or data that changes over time.<br>● Determine the measures of central tendency (range, median, mean, mode) for a given set of data. |

| Achievement Standard: 5.MD.3 Understand concepts of volume. | |
|---|---|
| 5.MD.3.1 | Recognize volume as an attribute of solid figures and measure volume by counting unit cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units. |
| 5.MD.3.2 | Relate volume to the operations of multiplication and addition. |
| | ● Find the volume of a rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths. |
| | ● Build understanding of the volume formula for rectangular prisms with whole-number edge lengths in the context of solving problems. |
| | ● Find volume of solid figures with one-digit dimensions composed of two non-overlapping rectangular prisms. |

| **Geometry** | |
|---|---|
| Achievement Standard: 5.G.1 Understand the coordinate plane. | |
| 5.G.1.1 | Graph points in the first quadrant of a coordinate plane, and identify and interpret the ***x*** and ***y*** coordinates to solve problems. |

| Achievement Standard: 5.G.2 Classify quadrilaterals and their attributes and circles. | |
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| 5.G.2.1 | Classify quadrilaterals into categories based on their properties. |
| | ● Explain that attributes belonging to a category of quadrilaterals also belong to all subcategories of that category. |
| | ● Understand perimeter and area of simple quadrilaterals and solve real world application problems |
| 5.G.2.2 | Draw and measure acute, right, and obtuse angles; identify and label the vertex, rays, interior and exterior of an angle. |

| | |
|---|---|
| 5.G.2.3 | Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships. |
| 5.G.2.4 | Identify and determine the relationships among the radius, diameter, chord, center, and circumference of circles. |