

Diocese of Raleigh Catholic Schools

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Raleigh, NC 27613

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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

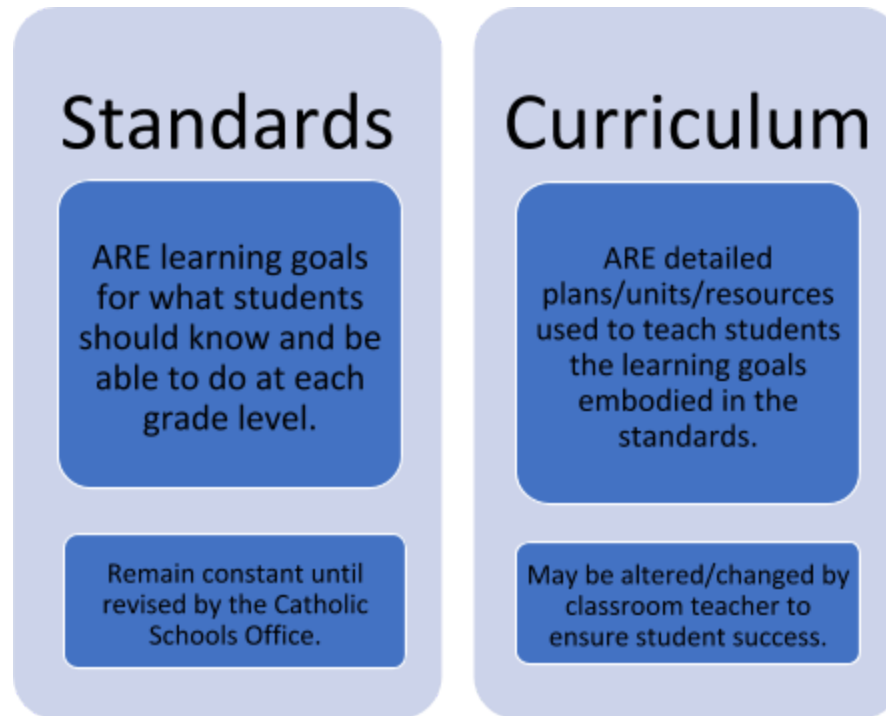
Counting and Cardinality [CC]
Operations and Algebraic Thinking [OA]
Number and Operations in Base Ten [NBT]
Number and Operations - Fractions [NF]
Measurement and Data [MD]
Geometry [G]
Ratio and Proportional Relationships [RP]
The Number System [NS]
Expressions and Equations [EE]
Statistics and probability [SP]
Functions [F]

SAMPLE

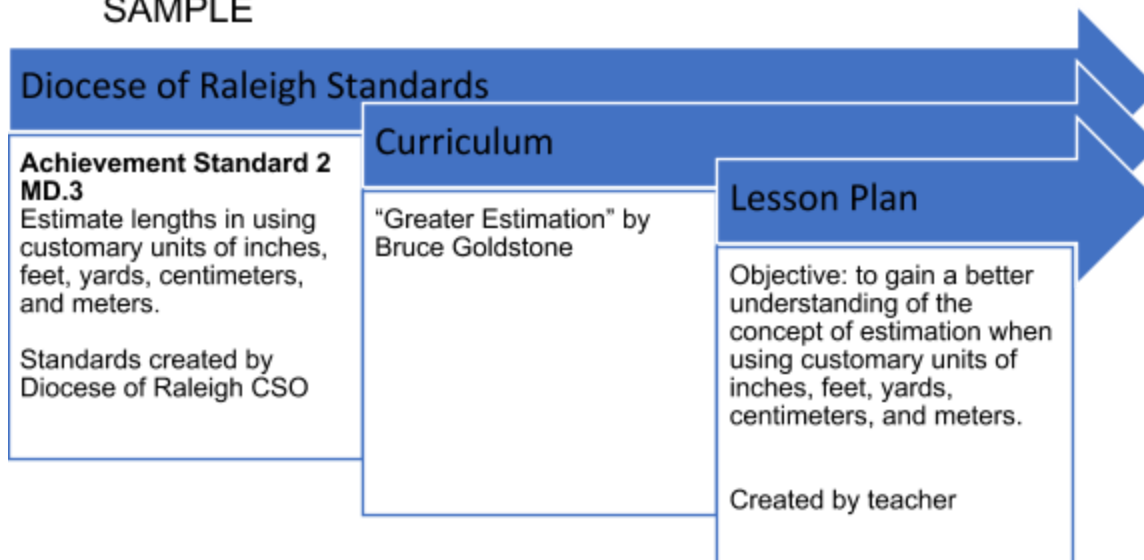
Counting and Cardinality		← Overarching Standard
Achievement Standard: K.CC 1 Know number names and the counting sequence.		← Achievement Standard
K.CC 1.1	Know number names and recognize patterns in the counting sequence by: <ul style="list-style-type: none"> • Counting to 100 by ones. • Counting to 100 by tens. 	← Goals
K.CC 1.2	Count.....	
K.CC 1.3	Write numbers.....	

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SAMPLE



Seventh Grade

Ratio and Proportional Relationships	
Achievement Standard: 7.RP.1 Analyze proportional relationships and use them to solve real-world and mathematical problems.	
7.RP.1.1	Compute unit rates associated with ratios of fractions to solve real-world and mathematical problems including like or different units.
7.RP.1.2	<p>Recognize and represent proportional relationships between quantities.</p> <ul style="list-style-type: none"> ● Understand that a proportion is an equation which states that two ratios are equal. <ul style="list-style-type: none"> ○ Represent and recognize proportional relationships using tables and graphs. ○ Compare two different proportional relationships using a variety of methods: tables, graphs, equations and verbal descriptions. ● Identify the constant of proportionality within two quantities in a proportional relationship using tables, graphs, equations and verbal descriptions. ● Create equations and graphs to represent proportional relationships. ● Use a graphical representation of a proportional relationship in context to: <ul style="list-style-type: none"> ○ Explain the meaning of any point on the graph. ○ Explain the meaning of the origin and why it is included in the data. ○ Understand the y-coordinate of an ordered pair (1,r) corresponds to the unit rate and interpret its meaning.
7.RP.1.3	Use scale factors and unit rates in proportional relationships to solve ratio and percent problems.

The Number System	
Achievement Standard: 7.NS.1 Interpret and evaluate expressions involving rational numbers.	
7.NS.1.1	<p>Extend previous understanding of adding and subtracting integers.</p> <ul style="list-style-type: none"> ● Apply the rules for adding and subtracting integers to rational numbers. ● Apply the rules for adding and subtracting rational numbers to real-life problems. ● Show that a number and its opposite have a sum of zero (Additive Inverse).
7.NS.1.2	<p>Extend previous understanding of multiplying and dividing integers.</p> <ul style="list-style-type: none"> ● Apply the rules for multiplying and dividing integers to rational numbers. ● Apply the rules for multiplying and dividing rational numbers to real-life problems. ● Understand that fractions represent a form of division; convert a fraction to a decimal using long division. ● Realize that decimal numbers either terminate in zero or repeat.

7.NS.1.3	<p>Use rational numbers in mathematical and real-life contexts.</p> <ul style="list-style-type: none"> ● Solve multi-step real-life and mathematical problems involving the four operations with rational numbers. ● Interpret rational numbers by describing their use in real world contexts.
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Expressions and Equations	
Achievement Standard: 7.EE.1 Use properties of operations to generate equivalent expressions.	
7.EE.1.1	Apply and extend the properties of operations, including the distributive property, as strategies to add, subtract, factor, and expand algebraic expressions with rational coefficients and factor linear expressions using an integer GCF.
7.EE.1.2	<p>Understand that variables represent quantities in real-world and mathematical problems.</p> <ul style="list-style-type: none"> ● Understand and interpret all parts of an algebraic expression. ● Rewrite an expression using algebraic properties.

Achievement Standard: 7.EE.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.	
7.EE.2.1	<p>Extend understanding of numbers to solve multi-step problems, both mathematical and real-world, with rational numbers in algebraic expressions.</p> <ul style="list-style-type: none"> ● Use operations of numbers to calculate with both positive and negative rational numbers. ● Convert between all forms of rational numbers and equivalent forms of algebraic expressions.
7.EE.2.2	<p>Use variables to represent quantities in a real-world or mathematical problem.</p> <ul style="list-style-type: none"> ● Construct and solve multi-step equations and inequalities to solve problems. ● Solve equations and inequalities with the variable on one side and which include like terms and the distributive property. ● Compare the processes of solving equations and inequalities. ● Interpret and graph the solution set of an inequality.

Geometry

Achievement Standard: 7.G.1 Draw, construct, and describe geometrical figures and describe the relationships between them.

7.G.1.1	Solve problems involving scale drawings of geometric figures by: <ul style="list-style-type: none">● Building an understanding that angle measures remain the same and side lengths are proportional.● Using a scale factor to compute actual lengths and areas from a scale drawing.● Creating a scale drawing.
7.G.1.2	Understand the characteristics of angles and side lengths that create a unique triangle, more than one triangle, or not a triangle. Build triangles from three measures of angles and/or sides.

Achievement Standard: 7.G.2 Solve real-world and mathematical problems involving angle measure, area, surface area, and volume.

7.G.2.1	Understand area and circumference of a circle <ul style="list-style-type: none">● Understand the relationship between the radius, diameter, circumference, and area.● Know and apply the formulas for area and circumference of a circle.
7.G.2.2	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure.
7.G.2.3	Solve real-world and mathematical problems involving: <ul style="list-style-type: none">● Area and perimeter of two-dimensional objects composed of triangles, quadrilaterals, and polygons● Volume and surface area of pyramids, prisms, cylinders or three-dimensional objects composed of cubes, pyramids and right prisms.

Statistics and Probability

Achievement Standard: 7.SP.1 Use random sampling to draw inferences about a population.

7.SP.1.1	Understand that statistics can be used to gain information about a population by: <ul style="list-style-type: none">● Recognizing that generalizations about a population from a sample are valid only if the sample is representative of that population.● Using random sampling to produce representative samples to support valid inferences.
7.SP.1.2	Generate multiple random samples of the same size to gauge the variation in estimates or predictions and use this data to draw inferences about a population with an unknown characteristic of interest.

Achievement Standard: 7.SP.2 Make informal inferences to compare two populations.	
7.SP.2.1	<p>Recognize the role of variability when comparing two populations.</p> <ul style="list-style-type: none"> ● Calculate the measure of variability of a data set and understand that it describes how the values of a data set vary with a single number. <ul style="list-style-type: none"> ○ Understand the mean absolute deviation of a data set is a measure of the variability that describes the average distance that points within a data set are from the mean of the data set. ○ Understand that range describes the spread of the entire data set. ○ Understand that the interquartile range describes the spread of the middle 50% of the data. ● Informally assess the difference between two data sets by examining the overlap and separation between the graphical representations of the two data sets.
7.SP.2.2	Use measures of center and measures of variability for numerical data from random samples to draw comparative inferences about two populations.

Achievement Standard: 7.SP.3 Investigate chance processes and develop, use, and evaluate probability models.	
7.SP.3.1	Understand that the probability of chance events is a number between 0 and 1 that indicates the likelihood of the event occurring.
7.SP.3.2	Collect data to calculate the experimental probability of a chance event, observing its long-run relative frequency. Use the experimental probability to predict the approximate relative frequency.
7.SP.3.3	<p>Develop a probability model and use it to find probabilities of simple events.</p> <ul style="list-style-type: none"> ● Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probability of events. ● Develop a probability model (which may not be uniform) by repeatedly performing a chance process and observing frequencies in the data generated. ● Compare theoretical and experimental probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
7.SP.3.4	<p>Determine probabilities of compound events using organized lists, tables, tree diagrams and simulation.</p> <ul style="list-style-type: none"> ● Understand that the probability of a compound event is a fraction of outcomes in the sample space for which the compound event occurs. ● For an event described in everyday language, identify the outcomes in the sample space which compose the event, when the sample space is represented using organized lists, tables and tree diagrams. ● Design and use simulation to generate frequencies for compound events.