Alignment of Common Core State Standards
And
2007 SC Academic Standards

The Number System
Expressions and Equations
Functions
Geometry
Statistics and Probability

Color Key

- Black - Common Core State Standards.
- Blue - SC 2007 standards Remember: In the notation for the SC 2007 Standards the first digit is the grade. For example *3-2.1* means this is a SC third grade standard.
- Red - Mary's notes/comments.

8th Grade

The Number System

➢ *Know that there are numbers that are not rational, and approximate them by rational numbers.*

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- 8-2.3 Represent the approximate location of irrational numbers on a number line.

- Know that numbers that are not rational are called irrational. (8.NS1)
  - Understand informally that every number has a decimal expansion;
  - for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
- Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π2). For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations. (8.NS2)
  - 8-2.4 Compare rational and irrational numbers by using the symbols ≤, ≥, <, >, and =.

Expressions and Equations

➢ Work with radicals and integer exponents.

- ➢ Understand the connections between proportional relationships, lines, and linear equations.
- ➢ Analyze and solve liner equations and pairs of simultaneous linear equations.

- ✓ Work with radicals and integer exponents.
- Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 32 × 3–5 = 3–3 = 1/33 = 1/27. (8.EE1)
- Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. (8.EE2)
  - Evaluate square roots of small perfect squares and cube roots of small perfect cubes.
  - Know that √2 is irrational.
- Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 times 108 and the population of the world as 7 times 109, and determine that the world population is more than 20 times larger. (8.EE3)
- Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. (8.EE4)
  - Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading).
  - Interpret scientific notation that has been generated by technology.
    - 7-2.7 Translate between standard form and scientific notation.

- ✓ Understand the connections between proportional relationships, lines, and linear equations.

8-3.3 Use commutative, associative, and distributive properties to examine the equivalence of a variety of algebraic expressions.

8-4.2 Use ordered pairs, equations, intercepts, and intersections to locate points and lines in a coordinate plane.

- Graph proportional relationships, interpreting the unit rate as the slope of the graph. (8.EE5)
  - Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
    - 7-3.3 Understand slope as a constant rate of change.
    - 7-3.7 Classify relationships as either directly proportional, inversely proportional, or nonproportional.
    - 8-3.2 Represent algebraic relationships with equations and inequalities.

    - 8-3.6 Identify the coordinates of the x- and y-intercepts of a linear equation from a graph, equation, and/or table.
    - 8-3.7 Identify the slope of a linear equation from a graph, equation, and/or table.
- Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; (8.EE6)
    - derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.

✓ Analyze and solve linear equations and pairs of simultaneous linear equations.

8-2.1 Apply an algorithm to add, subtract, multiply, and divide integers. Moved to 7.NS – Could align with 8.EE Linear Equations

8-3.4 Apply procedures to solve multistep equations. Could align with 8.EE Linear Equations

- Solve linear equations in one variable. (8.EE7)
    - Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). (8.EE7a)
    - Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. (8.EE7b)
- Analyze and solve pairs of simultaneous linear equations. (8.EE8)
    - Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. (8.EE8a)
    - Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6. (8.EE8b)
    - Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair. (8.EE8c)

Functions

➢ Define, evaluate, and compare functions.
➢ Use functions to model relationships between quantities.

✓ Define, evaluate, and compare functions

- Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an

input and the corresponding output. Function notation is not required in Grade 8. (8.F1)

- Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. (8.F2)
  - 8-3.1 Translate among verbal, graphic, tabular, and algebraic representations of linear functions.
- Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function A = s2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line. (8.F3)
  - 8-3.5 Classify relationships between two variables in graphs, tables, and/or equations as either linear or nonlinear.

✓ Use functions to model relationships between quantities.

- Construct a function to model a linear relationship between two quantities. (8.F4)
  - Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph.
  - Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
    - 5-3.2 Analyze patterns and functions with words, tables, and graphs.
    - 5-3.5 Analyze situations that show change over time.
    - 7-3.2 Analyze tables and graphs to describe the rate of change between and among quantities.
- Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). (8.F5)
    - 2-3.4 Identify quantitative and qualitative change over time.
    - 2-3.5 Analyze quantitative and qualitative change over time.
  - Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
    - 3-3.4 Illustrate situations that show change over time as increasing.
    - 4-3.6 Illustrate situations that show change over time as either increasing, decreasing, or varying.
    - 6-3.1 Analyze numeric and algebraic patterns and pattern relationships.

Geometry

- ➢ Understand congruence and similarity using physical models, transparencies, or geometry software.

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8-5.1 Use proportional reasoning and the properties of similar shapes to determine the length of a missing side.

8-5.6 Analyze a variety of measurement situations to determine the necessary level of accuracy and precision.

- Verify experimentally the properties of rotations, reflections, and translations: (8.G1)
    - 6-4.7 Compare the angles, side lengths, and perimeters of similar shapes.
  - Lines are taken to lines, and line segments to line segments of the same length. (8.G1a)
  - Angles are taken to angles of the same measure. (8.G1b)
  - Parallel lines are taken to parallel lines. (8.G1c)
- Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; (8.G2)
  - Given two congruent figures, describe a sequence that exhibits the congruence between them.
    - 4-4.5 Use transformation(s) to prove congruency.
- Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. (8.G3)
  - 6-4.6 Explain how transformations affect the location of the original polygon in the coordinate plane.
  - 8-4.3 Apply a dilation to a square, rectangle, or right triangle in a coordinate plane.
  - 8-4.4 Analyze the effect of a dilation on a square, rectangle, or right triangle in a coordinate plane.
- Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; (8.G4)
  - Given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
    - 6-4.8 Classify shapes as similar.
- Use informal arguments to establish facts (8.G5)
  - about the angle sum and exterior angle of triangles,
  - about the angles created when parallel lines are cut by a transversal, and
    - 7-4.5 Analyze the congruent and supplementary relationships—specifically, alternate interior, alternate exterior, corresponding, and adjacent—of the angles formed by parallel lines and a transversal.

- the angle-angle criterion for similarity of triangles.
- For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.

✓ Understand and apply the Pythagorean Theorem.
- 8-4.1Apply the Pythagorean theorem.

- Explain a proof of the Pythagorean Theorem and its converse. (8.G6)
- Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (8.G7)
- Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. (8.G8)

✓ Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.
- Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. (8.G9)
  - 8-5.2 Explain the effect on the area of two-dimensional shapes and on the volume of three-dimensional shapes when one or more of the dimensions are changed.
  - 8-5.3 Apply strategies and formulas to determine the volume of the three-dimensional shapes cone and sphere.
  - 8-5.4 Apply formulas to determine the exact (*pi)* circumference and area of a circle. Actually aligns with 7.G4 but fits 8.G9 because volume of cylinder base is a circle.)

Statistics and Probability

➢ Investigate patterns of association in bivariate data.

✓ Investigate patterns of association in bivariate data.
- Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. (8.SP1)
  - Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
    - 8-6.4 Apply procedures to calculate the probability of two dependent events.
    - 8-6.5 Interpret the probability for two dependent events.
- Know that straight lines are widely used to model relationships between two quantitative variables. (8.SP2)
  - For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
    - 8-6.1 Generalize the relationship between two sets of data by using scatterplots and lines of best fit.

- Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height. (8.SP3)
- Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. (8.SP4)
  - Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects.
  - Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?

SC 2007 Academic Standards not specifically aligned to Common Core State Standards at this grade.

Number and Operations

8-2.1 Apply an algorithm to add, subtract, multiply, and divide integers. Moved to 7.NS – Could align with 8.EE Linear Equations

8-2.2 Understand the effect of multiplying and dividing a rational number by another rational number.

8-2.5 Apply the concept of absolute value.

8-2.6 Apply strategies and procedures to approximate between two whole numbers the square roots or cube roots of numbers less than 1,000.

8-2.7 Apply ratios, rates, and proportions. Moved to 7.RP3

Measurement

8-5.4 Apply formulas to determine the exact (*pi)* circumference and area of a circle. Actually aligns with 7.G4 but fits 8.G9 because volume of cylinder base is a circle.)

8-5.5 Apply formulas to determine the perimeters and areas of trapezoids.

8-5.7 Use multistep unit analysis to convert between and within U.S. Customary System and the metric system.

Data Analysis and Probability

8-6.2 Organize data in matrices or scatterplots as appropriate.

8-6.3 Use theoretical and experimental probability to make inferences and convincing arguments about an event or events. Moved to 7.SP6

8-6.4 Apply procedures to calculate the probability of two dependent events.

8-6.5 Interpret the probability for two dependent events. Moved to 7.SP8

8-6.6 Apply procedures to compute the odds of a given event.

8-6.7 Analyze probability using area models. Moved to 7.SP7
8-6.8 Interpret graphic and tabular data representations by using range and the measures of central tendency (mean, median, and mode).