

# Alignment of Common Core State Standards And 2007 SC Academic Standards

## Ratios and Proportional Relationships The Number System Expressions and Equations 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.

## 7<sup>th</sup> Grade

### Ratio and Proportional Relationships

- *Analyze proportional relationships and use them to solve real-world and mathematical problems.*
- ✓ *Analyze proportional relationships and use them to solve real-world and mathematical problems.*
- Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks  $\frac{1}{2}$  mile in each  $\frac{1}{4}$  hour, compute the unit rate as the complex fraction  $\frac{1/2}{1/4}$  miles per hour, equivalently 2 miles per hour. (7.RP1)
  - 6-5.6 Use proportions to determine unit rates.
- Recognize and represent proportional relationships between quantities. (7.RP2)
  - Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. (7.RP2a)
  - Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (7.RP2b)
  - Represent proportional relationships by equations. For example, if total cost  $t$  is proportional to the number  $n$  of items purchased at a constant price  $p$ , the relationship between the total cost and the number of items can be expressed as  $t = pn$ . (7.RP2c)
    - 7-3.6 Represent proportional relationships with graphs, tables, and equations.

- Explain what a point  $(x, y)$  on the graph of a proportional relationship means in terms of the situation, with special attention to the points  $(0, 0)$  and  $(1, r)$  where  $r$  is the unit rate. (7.RP2d)
- Use proportional relationships to solve multi-step ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. (7.RP3)
  - 7-2.5 Apply ratios, rates, and proportions to discounts, taxes, tips, interest, unit costs and similar shapes.
  - 8-2.7 Apply ratios, rates, and proportions.

### **The Number System**

- *Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.*
- ✓ *Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.*
  - 7-2.8 Generate strategies to add, subtract, multiply, and divide integers.
  - 8-2.1 Apply an algorithm to add, subtract, multiply, and divide integers.
- Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. (7.NS1)
  - Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged. (7.NS1a)
  - Understand  $p + q$  as the number located a distance  $|q|$  from  $p$ , in the positive or negative direction depending on whether  $q$  is positive or negative. (7.NS1b)
    - Show that a number and its opposite have a sum of 0 (are additive inverses).
    - Interpret sums of rational numbers by describing real-world contexts.
  - Understand subtraction of rational numbers as adding the additive inverse,  $p - q = p + (-q)$ . (7.NSc)
    - Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
  - Apply properties of operations as strategies to add and subtract rational numbers. (7.NS1d)
- Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. (7.NS2)
  - Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as  $(-1)(-1) = 1$  and the rules for multiplying signed numbers. (7.NS2a)

- Interpret products of rational numbers by describing real-world contexts.
- Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If  $p$  and  $q$  are integers, then  $-(p/q) = (-p)/q = p/(-q)$ . (7.NS2b)
  - Interpret quotients of rational numbers by describing real-world contexts.
- Apply properties of operations as strategies to multiply and divide rational numbers. (7.NS2c)
- Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. (7.NS2c)
- Solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

### **Expressions and Equations**

- *Use properties of operations to generate equivalent expressions.*
  - *Solve real-life and mathematical problems using numerical and algebraic expressions and equations.*
- 
- ✓ *Use properties of operations to generate equivalent expressions.*
  - Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (7.EE1)
  - Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example,  $a + 0.05a = 1.05a$  means that “increase by 5%” is the same as “multiply by 1.05.” (7.EE2)
- 
- ✓ *Solve real-life and mathematical problems using numerical and algebraic expressions and equations.*
  - Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. (7.EE3)
    - Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional  $1/10$  of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar  $9\frac{3}{4}$  inches long in the center of a door that is  $27\frac{1}{2}$  inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.
  - Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (7.EE4)
    - Solve word problems leading to equations of the form  $px + q = r$  and  $p(x + q) = r$ , where  $p$ ,  $q$ , and  $r$  are specific rational numbers. Solve

equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm.

What is its width? (7.EE4a)

- Solve word problems leading to inequalities of the form  $px + q > r$  or  $px + q < r$ , where  $p$ ,  $q$ , and  $r$  are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions. (7.EE4b)
  - 7-3.4 Use inverse operations to solve two-step equations and two-step inequalities.
  - 7-3.5 Represent on a number line the solution of a two-step inequality.

### Geometry

- Draw construct, and describe geometrical figures and describe the relationships between them.
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
- ✓ Draw construct, and describe geometrical figures and describe the relationships between them.
- Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. (7.G1)
  - 7-4.6 Compare the areas of similar shapes and the areas of congruent shapes.
  - 7-4.7 Explain the proportional relationship among attributes of similar shapes.
  - 7-4.8 Apply proportional reasoning to find missing attributes of similar shapes.
- Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. (7.G2)
  - Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
- Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. (7.G3)
  - 7-4.3 Illustrate the cross section of a solid.
- ✓ Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
- Know the formulas for the area and circumference of a circle and use them to solve problems; (7.G4)

7<sup>th</sup> Grade Alignment

- give an informal derivation of the relationship between the circumference and area of a circle.
  - 6-5.1 Explain the relationships among the circumference, diameter, and radius of a circle.
  - 6-5.2 Apply strategies and formulas with an approximation of  $\pi$  (3.14, or  $\frac{22}{7}$ ) to find the circumference and area of a circle.
  - 8-5.4 Apply formulas to determine the exact ( $\pi$ ) circumference and area of a circle.
- Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. (7.G5)
  - 6-4.9 Classify pairs of angles as either complementary or supplementary.
- Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (7.G6)

### **Statistics and Probability**

- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.
- ✓ Use random sampling to draw inferences about a population.
- Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. (7.SP1)
  - Understand that random sampling tends to produce representative samples and support valid inferences.
- Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. (7.SP2)
  - Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data.
  - Gauge how far off the estimate or prediction might be.
    - 6-6.1 Predict the characteristics of one population based on the analysis of sample data.
- ✓ Draw informal comparative inferences about two populations.
- Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of

players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable. (7.SP3)

- Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. (7.SP4)
  - 7-6.1 Predict the characteristics of two populations based on the analysis of sample data.
  
- ✓ Investigate chance processes and develop, use, and evaluate probability models.
- Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. (7.SP5)
  - 1-6.4 Predict on the basis of data whether events are *likely* or *unlikely* to occur.
  - 2-6.4 Predict on the basis of data whether events are *more likely* or *less likely* to occur.
  - 3-6.6 Predict on the basis of data whether events are *likely*, *unlikely*, *certain*, or *impossible* to occur.
  - 3-6.7 Understand when the probability of an event is 0 or 1.
  - 4-6.6 Predict on the basis of data whether events are *likely*, *unlikely*, *certain*, *impossible*, or *equally likely* to occur.
- Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and (7.SP6)
  - predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.
    - 8-6.3 Use theoretical and experimental probability to make inferences and convincing arguments about an event or events.
- Develop a probability model and use it to find probabilities of events. (7.SP7)
  - 5-6.5 Represent the probability of a single-stage even in words and fractions.
  - Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
    - 7-6.7 Differentiate between experimental and theoretical probability of the same event.
  - Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected. (7.SP7a)

- Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies? (7.SP7b)
  - 4-6.7 Analyze possible outcomes for a simple event.
  - 5-6.6 Conclude why the sum of the probabilities of the outcomes of an experiment must equal 1.
- Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. (7.SP8)
  - 6-6.4 Use theoretical probability to determine the sample space and probability for one- and two-stage events such as tree diagrams, models, lists, charts, and pictures.
  - 7-6.5 Apply procedures to calculate the probability of mutually exclusive simple or compound events.
  - 7-6.6 Interpret the probability of mutually exclusive simple or compound events.
- Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. (7.SP8a)
- Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event. (7.SP8b)
- Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood? (7.SP8c)
  - 7-6.8 Use the fundamental counting principle to determine the number of possible outcomes for a multistage event.

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

Number and Operations

- 7-2.1 Understand fractional percentages and percentages greater than one hundred.
- 7-2.3 Compare rational numbers, percentages, and square roots of perfect squares by using the symbols  $\leq$ ,  $\geq$ ,  $<$ ,  $>$ , and  $=$ .
- 7-2.4 Understand the meaning of absolute value. Moved to 6.NS7c – Could align with 7.NS.1b
- 7-2.6 Translate between standard form and exponential form.
- 7-2.7 Translate between standard form and scientific notation. Moved to 8.EE4

- 7-2.9 Apply an algorithm to multiply and divide fractions and decimals.  
Moved to 6.NS1 (divide fractions) and 6.NS3 (multiply and divide decimals)
- 7-2.10 Understand the inverse relationship between squaring and finding the square roots of perfect squares.

### Algebra

- 7-3.1 Analyze geometric patterns and pattern relationships.
- 7-3.2 Analyze tables and graphs to describe the rate of change between and among quantities. Moved to 8.F4
- 7-3.3 Understand slope as a constant rate of change. Moved to 8.EE5
- 7-3.7 Classify relationships as either directly proportional, inversely proportional, or nonproportional. Moved to 8.EE5

### Geometry

- 7-4.1 Analyze geometric properties and the relationships among the properties of triangles, congruence, similarity, and transformations to make deductive arguments.
- 7-4.2 Explain the results of the intersection of two or more geometric shapes in a plane.
- 7-4.4 Translate between two- and three-dimensional representations of compound figures.
- 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. Moved to 8G.5
- 7-4.9 Create tessellations with transformations.
- 7-4.10 Explain the relationship of the angle measurements among shapes that tessellate.

### Measurement

- 7-5.1 Use ratio and proportion to solve problems involving scale factors and rates.
- 7-5.2 Apply strategies and formulas to determine the surface area and volume of the three-dimensional shapes prism, pyramid, and cylinder. Moved to 6.G4
- 7-5.3 Generate strategies to determine the perimeters and areas of trapezoids.
- 7-5.4 Recall equivalencies associated with length, mass and weight, and liquid volume:  
1 square yard = 9 square feet, 1 cubic meter = 1 million cubic centimeters,  
 $\frac{5}{8}$  mile = 1 kilometer, 1 inch = 2.54 centimeters; 1 kilogram = 2.2 pounds; and  
1.06 quarts = 1 liter.

7-5.5 Use one-step unit analysis to convert between and within the U.S. Customary System and the metric system.

Data Analysis and Probability

7-6.2 Organize data in [box plots](#) or circle graphs as appropriate. Moved to 6.SP4

7-6.3 Apply procedures to calculate the interquartile range. Moved to 6.SP5c

7-6.4 Interpret the interquartile range for data. Moved to 6.SP5c