Common Core Skill Alignment

7TH GRADE MATH

7.RP Ratios and Proportional Relationships

7.RP.A Analyze proportional relationships and use them to solve real-world and mathematical problems.

7.RP.A.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

- [ ] **M.3** Unit prices

7.RP.A.2 Recognize and represent proportional relationships between quantities.

7.RP.A.2a 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.

- [ ] **J.2** Identify equivalent ratios
- [ ] **J.4** Equivalent ratios: word problems
- [ ] **J.8** Do the ratios form a proportion?
- [ ] **J.9** Do the ratios form a proportion: word problems
- [ ] **K.3** Identify proportional relationships by graphing
- [ ] **K.6** Identify proportional relationships

7.RP.A.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

- [ ] **K.1** Find the constant of proportionality from a table
- [ ] **K.4** Find the constant of proportionality from a graph

7.RP.A.2c Represent proportional relationships by equations.

- [ ] **J.11** Solve proportions: word problems

- [ ] **J.12** Estimate population size using proportions
- [ ] **K.2** Write equations for proportional relationships from tables
- [ ] **K.5** Write equations for proportional relationships from graphs
- [ ] **K.8** Write and solve equations for proportional relationships
- [ ] **L.5** Percents of numbers and money amounts
- [ ] **L.6** Percents of numbers: word problems
- [ ] **L.7** Solve percent equations

7.RP.A.2d 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.

- [ ] **K.7** Interpret graphs of proportional relationships

7.RP.A.3 Use proportional relationships to solve multistep ratio and percent problems.

- [ ] **L.8** Solve percent equations: word problems
- [ ] **L.9** Percent of change
- [ ] **L.10** Percent of change: word problems
- [ ] **M.4** Unit prices with unit conversions
- [ ] **M.5** Unit prices: find the total price
- [ ] **M.6** Percent of a number: tax, discount, and more
- [ ] **M.7** Find the percent: tax, discount, and more
- [ ] **M.8** Sale prices: find the original price
- [ ] **M.9** Multi-step problems with percents
- [ ] **M.11** Simple interest

7.NS The Number System

7.NS.A Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

7.NS.A.1 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.NS.A.1a Describe situations in which opposite quantities combine to make 0.

- [ ] **B.4** Absolute value and opposite integers

7.NS.A.1b 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. 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.

- [ ] **C.1** Integer addition and subtraction rules

7.NS.A.1c Understand subtraction of rational numbers as adding the additive inverse, p - q = p + (-q). 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.

- [ ] **C.1** Integer addition and subtraction rules

7.NS.A.1d Apply properties of operations as strategies to add and subtract rational numbers.

- [ ] **C.2** Add and subtract integers using counters
- [ ] **C.3** Add and subtract integers
- [ ] **E.1** Add and subtract decimals
- [ ] **G.1** Add and subtract fractions
- [ ] **G.3** Add and subtract mixed numbers
- [ ] **H.6** Add and subtract rational numbers

7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

7.NS.A.2a 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. Interpret products of rational numbers by describing real-world contexts.

- [ ] **C.6** Integer multiplication and division rules
- [ ] **H.9** Apply multiplication and division rules

7.NS.A.2b 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). Interpret quotients of rational numbers by describing real-world contexts.

- **C.6** Integer multiplication and division rules
- **H.9** Apply multiplication and division rules

7.NS.A.2c Apply properties of operations as strategies to multiply and divide rational numbers.

- **C.7** Multiply and divide integers
- **E.3** Multiply decimals
- **E.5** Divide decimals
- **G.7** Multiply fractions and whole numbers
- **G.9** Multiply fractions
- **G.10** Multiply mixed numbers
- **G.12** Divide fractions
- **G.13** Divide mixed numbers
- **H.8** Multiply and divide rational numbers

7.NS.A.2d 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.

- **A.10** Classify numbers
- **H.1** Convert between decimals and fractions or mixed numbers

7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

- **C.4** Complete addition and subtraction equations with integers
- **C.5** Add and subtract integers: word problems
- **C.8** Complete multiplication and division equations with integers
- **E.2** Add and subtract decimals: word problems
- **E.4** Multiply decimals and whole numbers: word problems
- **E.6** Divide decimals by whole numbers: word problems

- [ ] **E.8** Add, subtract, multiply, and divide decimals: word problems
- [ ] **G.2** Add and subtract fractions: word problems
- [ ] **G.4** Add and subtract mixed numbers: word problems
- [ ] **G.11** Multiply fractions and mixed numbers: word problems
- [ ] **G.14** Divide fractions and mixed numbers: word problems
- [ ] **G.16** Add, subtract, multiply, and divide fractions and mixed numbers: word problems
- [ ] **M.1** Add, subtract, multiply, and divide money amounts: word problems
- [ ] **M.2** Price lists
- [ ] **N.1** Estimate to solve word problems

7.EE Expressions and Equations

7.EE.A Use properties of operations to generate equivalent expressions.

7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

- [ ] **R.10** Multiply using the distributive property
- [ ] **R.12** Write equivalent expressions using properties
- [ ] **R.14** Add, subtract, and multiply linear expressions
- [ ] **R.15** Factors of linear expressions
- [ ] **R.16** Identify equivalent linear expressions

7.EE.A.2 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.

7.EE.B Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

7.EE.B.3 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. 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.

- [ ] **C.9** Evaluate numerical expressions involving integers
- [ ] **E.10** Maps with decimal distances
- [ ] **E.11** Evaluate numerical expressions involving decimals
- [ ] **G.17** Maps with fractional distances
- [ ] **G.18** Evaluate numerical expressions involving fractions
- [ ] **I.8** Evaluate numerical expressions involving exponents
- [ ] **N.2** Multi-step word problems
- [ ] **R.3** Evaluate linear expressions
- [ ] **R.4** Evaluate multi-variable expressions
- [ ] **R.6** Evaluate nonlinear expressions

7.EE.B.4 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.EE.B.4a 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.

- [ ] **S.3** Model and solve equations using algebra tiles
- [ ] **S.6** Solve two-step equations
- [ ] **S.7** Solve equations: word problems
- [ ] **S.8** Solve equations involving like terms
- [ ] **S.9** Solve equations: complete the solution
- [ ] **U.4** Solve word problems involving two-variable equations

7.EE.B.4b 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.

- [ ] **T.4** Solve one-step inequalities
- [ ] **T.5** Graph solutions to one-step inequalities
- [ ] **T.6** Solve two-step inequalities
- [ ] **T.7** Graph solutions to two-step inequalities

7.G Geometry

7.G.A Draw, construct, and describe geometrical figures and describe the relationships between them.

7.G.A.1 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.

- **J.7** Scale drawings: word problems

7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. 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.

- **W.6** Graph triangles and quadrilaterals

7.G.A.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

- **Z.1** Bases of three-dimensional figures
- **Z.4** Cross-sections of three-dimensional figures

7.G.B Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

7.G.B.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

- **W.16** Parts of a circle
- **AA.5** Circles: calculate area, circumference, radius, and diameter
- **AA.6** Circles: word problems

7.G.B.5 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.

- **W.12** Identify complementary, supplementary, vertical, adjacent, and congruent angles

- [ ] **W.13** Find measures of complementary, supplementary, vertical, and adjacent angles

7.G.B.6 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.

- [ ] **AA.2** Area of rectangles and parallelograms
- [ ] **AA.3** Area of triangles and trapezoids
- [ ] **AA.7** Volume
- [ ] **AA.8** Surface area
- [ ] **AA.12** Area of compound figures with triangles, semicircles, and quarter circles
- [ ] **AA.13** Area between two shapes

7.SP Statistics and Probability

7.SP.A Use random sampling to draw inferences about a population.

7.SP.A.1 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. Understand that random sampling tends to produce representative samples and support valid inferences.

- [ ] **CC.6** Identify representative, random, and biased samples

7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

- [ ] **J.12** Estimate population size using proportions

7.SP.B Draw informal comparative inferences about two populations.

7.SP.B.3 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.

7.SP.B.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

- [ ] **CC.1** Calculate mean, median, mode, and range
- [ ] **CC.2** Interpret charts and graphs to find mean, median, mode, and range
- [ ] **CC.3** Mean, median, mode, and range: find the missing number
- [ ] **CC.4** Changes in mean, median, mode, and range

7.SP.C Investigate chance processes and develop, use, and evaluate probability models.

7.SP.C.5 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.

- [ ] **DD.1** Probability of simple events

7.SP.C.6 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 predict the approximate relative frequency given the probability.

- [ ] **DD.4** Make predictions

7.SP.C.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

7.SP.C.7a Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.

- [ ] **DD.1** Probability of simple events
- [ ] **DD.2** Probability of opposite, mutually exclusive, and overlapping events

7.SP.C.7b Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.

- [ ] **DD.3** Experimental probability

7.SP.C.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

7.SP.C.8a 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.

- **DD.2** Probability of opposite, mutually exclusive, and overlapping events
- **DD.6** Identify independent and dependent events
- **DD.7** Probability of independent and dependent events

7.SP.C.8b 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.

- **DD.5** Compound events: find the number of outcomes
- **DD.10** Counting principle

7.SP.C.8c Design and use a simulation to generate frequencies for compound events.