Focus Topic: RP – Ration & Proportional Relationships

TSW = The Student Will

Objective(s)	Common Core Alignment	Essential Questions	Understandings	Suggested Assessments
• TSW 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 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction $^{1/2}/_{1/4}$ miles per hour, equivalently 2 miles per hour)*	7.NBT.1	How do you know when to use ratios?	Fractions, decimals, and percents can be used interchangeably.	Ongoing observation & questioning during class discussions
• TSW recognize and represent proportional relationships between quantities	7.NBT.2	What determines an appropriate representation of a number?	Fractions, decimals, and percents express a relationship between two numbers.	Performance Tasks
• TSW 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.NBT.2	How is the probability of an event determined and described?	Data representation is not always accurate.	Short Constructed Response
• TSW identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships	7.NBT.2	Does changing the scale affect how data is communicated?		Extended Constructed Response
• TSW 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.NBT.2	Are there advantages and disadvantages in ways that data is presented?		Self-Assessment
• TSW 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.NBT.2	How are quadratic functions graphed?		Multiple Choice
• TSW use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error	7.NBT.3			Literature Connections

Focus Topic: G –Geometry

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Objective(s)	Common Core Alignment	Essential Questions	Understandings	Suggested Assessments
• TSW 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.G.1	Why do we study geometry?	Points, lines, and planes are the foundations of geometry.	Ongoing observation & questioning during class discussions
• TSW 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	7.G.2	How do patterns help us interpret the world around us?	All geometric figures have properties that make them unique.	Performance Tasks
• TSW 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.G.3	Where do we see patterns?	Understanding these properties can help us solve problems in the real world.	Short Constructed Response
• TSW know the formulas for the area and circumference of a circle and use them to solve problems	7.G.4			Extended Constructed Response
• TSW give an informal derivation of the relationship between the circumference and area of a circle	7.G.4			Self-Assessment
• TSW 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.G.5			Multiple Choice
• TSW 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.G.6			Literature Connections

Focus Topic: NS –The Number System

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Objective(s)	Common Core Alignment	Essential Questions	Understandings	Suggested Assessments
• TSW apply and extend previous understandings of addition and subtraction to add and subtract rational numbers	7.NS.1	How does expressing numbers in different forms make your mathematical life easier?	Data representation is not always accurate.	Ongoing observation & questioning during class discussions
• TSW represent addition and subtraction on a horizontal or vertical number line diagram	7.NS.1	When is it appropriate to use fractions?	Different ways of representing numbers.	Performance Tasks
• TSW 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.NS.1	How does the knowledge of GCF and LCM help in comparing fractions?	Math gives us the skills to solve problems effectively.	Short Constructed Response
• TSW 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.NS.1	How are variables used in math and life?		Extended Constructed Response
• TSW 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	7.NS.1	Why are mathematical rules necessary?		Self-Assessment
• TSW understand subtraction of rational numbers as adding the additive inverse, $p – q = p + (–q)$	7.NS.1			Multiple Choice
• TSW 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	7.NS.1			Literature Connections
• TSW apply properties of operations as strategies to add and subtract rational numbers	7.NS.1			
• TSW apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers	7.NS.2			

• TSW 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	7.NS.2			
• TSW 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.NS.2			
• TSW interpret quotients of rational numbers by describing real-world contexts	7.NS.2			
• TSW apply properties of operations as strategies to multiply and divide rational numbers	7.NS.2			
• TSW 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.NS.2			
• TSW solve real-world and mathematical problems involving the four operations with rational numbers	7.NS.3			

Focus Topic: EE –Expressions & Equations

TSW = The Student Will

Objective(s)	Common Core Alignment	Essential Questions	Understandings	Suggested Assessments
• TSW apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients	7.EE.1	How does solving equations help us problem solve in real life?	Algebraic representations can be used to solve real-life problems.	Ongoing observation & questioning during class discussions
• TSW 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.EE.2	In what situations would you use an inequality rather then an equation?	Computational estimations produce approximate results.	Performance Tasks

• TSW 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.EE.3	What is the purpose of estimation?	There are many procedures to problem solving.	Short Constructed Response
• TSW apply properties of operations to calculate with numbers in any form; convert between forms as appropriate	7.EE.3	What determines a reasonable estimation for a given situation?		Extended Constructed Response
• TSW 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 3/4 inches long in the center of a door that is 27 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)*	7.EE.3			Self-Assessment
• TSW 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.4			Multiple Choice
• TSW 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	7.EE.4			Literature Connections
• TSW 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.EE.4			
• TSW 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	7.EE.4			

• TSW 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.EE.4			

Focus Topic: SP – Statistics & Probability

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Objective(s)	Common Core Alignment	Essential Questions	Understandings	Suggested Assessments
• TSW understand that statistics can be used to gain information about a population by examining a sample of the population	7.SP.1	What are some ways to organize data?	The expected outcome of an event might actually happen in the future.	Ongoing observation & questioning during class discussions
• TSW develop generalizations about a population from a sample are valid only if the sample is representative of that population	7.SP.1	Are there advantages and disadvantages in ways that data is presented?	The probability is the mathematics of chance.	Performance Tasks
• TSW understand that random sampling tends to produce representative samples and support valid inferences	7.SP.1	How is the probability of an event determined and described?	Data representation is not always accurate.	Short Constructed Response
• TSW use data from a random sample to draw inferences about a population with an unknown characteristic of interest	7.SP.2	Why make predictions?	Statistical measures provide a numeric picture of the shape of the data.	Extended Constructed Response
• TSW 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)*	7.SP.2	Does changing the scale affect how data is communicated?		Self-Assessment

• TSW 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.SP.3			Multiple Choice
• TSW 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			Literature Connections
• TSW 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.SP.5			
• TSW 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.(*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)*	7.SP.6			
• TSW develop a probability model and use it to find probabilities of events	7.SP.7			
• TSW compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy	7.SP.7			

• TSW 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.SP.7			
• TSW 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.SP.7			
• TSW find probabilities of compound events using organized lists, tables, tree diagrams, and simulation	7.SP.8			
• TSW 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.SP.8			
• TSW 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.SP.8			
• TSW 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.SP.8			

Focus Topic: Mathematical Practices

TSW = The Student Will

Objective(s)
• TSW make sense of problems and persevere in solving them.
• TSW reason abstractly and quantitatively.
• TSW construct viable arguments and critique the reasoning of others.
• TSW model with mathematics.
• TSW use appropriate tools strategically.
• TSW attend to precision.
• TSW look for and make use of structure
• TSW look for and express regularity in repeated reasoning.