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Standards Based Map

7th Grade Math

Timeline	NxG Standard(s)	Student I Can Statement(s) / Learning Target(s)	Essential Questions	Academic Vocabulary	Strategies / Activities	Resources / Materials	Assessments	Notes / Self - Reflection
	M.7.NS.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. **a.** describe situations in which opposite quantities combine to make 0 **b.** understand $p + q$ as the number located a	I can express rational numbers as fractions, decimals, and percents. I can add and subtract rational numbers using the properties of operations. I can describe situations in which opposite quantities combine to make 0. I can represent addition of rational numbers on a vertical or horizontal	How can a number line be used to demonstrate the properties and processes of addition and subtraction of rational numbers?	rational numbers properties (associative, commutative, distributive, identity, inverse) number line integers opposite quantities additive inverse	Please record any strategies or activities that you find beneficial. **Teach 21 – Strategy Bank:** http://wvde.state.wv.us/strategybank/	Please record any resources or materials that you find beneficial. **Teacher Websites**: http://www.smarterbalanced.org/ (practice tests, sample items, etc.) http://www.opusmath.com/ (free math problem bank aligned to CCSS) http://donnayoung.org/index.htm (free math printables) http://www.math-	http://www.smarterbalanced.org/ (practice tests, sample items, etc.) http://www.map.mathshell.org/materials/index.php (Mathematics Assessment Project) Various assessments may be used (selected response, short answer, performance-based tasks, etc.). Please record any assessments you utilize and find effective.	

	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.** 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. **d.** apply properties of operations as strategies to add and subtract rational numbers. **M.7.EE.1** **apply properties of operations as strategies to add, subtract**, factor and expand linear expressions with rational coefficients.	number line using the sign of the value being added to determine direction. I can show that a number and its opposite are additive inverses. I can describe sums of rational numbers in real world contexts. I can use the additive inverse to write a subtraction problem as an addition problem. I can show the distance between two rational numbers on the number line is the absolute value of their difference. I can relate the properties of multiplication of fractions to the multiplication of rational numbers. I can use the rules for multiplying	How can properties of operations help in solving expressions involving addition and subtraction? How can the previous learned properties of multiplication and division be extended to multiplication and division of rational numbers?	inverse operations absolute value sum, difference, product, quotient non-zero divisor terminating decimal repeating decimal order of operations complex fractions	**Adding & Subtracting Integers:** Double-sided counters	drills.com/ (free math worksheets) https://www.teachingchannel.org/ http://www.brainpop.com/ (instructional videos and games) http://www.flocabulary.com/ (Educational Hip-Hop, all subjects) http://wveis.k12.wv.us/Teach21/public/ng_unit_plans/U_menu.cfm?tsele1=2 (Teach 21 – WVDE) http://wvde.state.wv.us/learn21/6/8/math/ (Learn 21 – WVDE) http://www.map.mathshell.org/materials/index.php (Mathematics Assessment Project) http://illuminations.nctm.org/ (NCTM – Illuminations) **Student Websites:** http://www.sheppardsoftware.com/math.htm (Sheppard Software – various math practice		

	M.7.NS.2 apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. **a.** 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. **b.** 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.** apply properties of	signed numbers to determine the sign of the product. I can interpret products of rational numbers by describing real-world situations. I can use multiplication of rational numbers to develop the procedure of dividing integers. I can explain why dividing by zero is undefined. I can use the rules for dividing signed numbers to determine the sign of the quotient. I can interpret quotients of rational numbers by describing real world situations. I can multiply and divide rational numbers using the properties of operations. I can convert	How is a rational number converted to a decimal? How can the four operations with rational numbers be used to solve real-world and mathematical problems which may include complex fractions? How are the properties of operations used to solve multi-step		**Multiplying & Dividing Integers:** Tic-Tac-Toe Board - (Make one diagonal of positives, fill in the rest of the tic-tac-toe board with negatives. Every "3 in a row" shows the rule for determining the sign of the product or quotient.)	games) http://www.thatquiz.org/ (That Quiz – various math practice games) http://www.mathplayground.com/ (Calculator Chaos, Alien Angles, etc.) http://www.sumdog.com/ (Sumdog – basic skills practice)		

	operations as strategies to multiply and divide rational numbers. **d.** 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. **M.7.NS.3** 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.) **M.7.EE.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	rational numbers into decimals using long division. I can verify that the decimal form of rational numbers either terminates in 0s or eventually repeats. I can use order of operations to solve mathematical and real-world problems with rational numbers. I can solve multi-step mathematical and real-world problems with positive and negative rational numbers I can apply properties of operations to calculate with numbers in any form. I can assess the reasonableness of answers using mental computation and estimation. I can apply	mathematical and real-world problems? How can the reasonableness of an answer be assessed? How can the properties of operations be used to transform linear expressions? How can rewriting an expression be helpful when solving mathematical and real-world problems? How are equations and inequalities used for solving real-world or mathematical problems?	expression linear expression coefficient variable evaluate factor expressions expand expressions equivalent expressions equation properties of equality (CCSS - Table 4) estimation	**Order of Operations:** PEMDAS (Please Excuse My Dear Aunt Sally)			

	answers using mental computation and estimation strategies. **M.7.EE.1** apply properties of operations as strategies to add, subtract, factor and expand linear expressions with rational coefficients. **M.7.EE.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. **M.7.EE.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. **a.** 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	properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. I can manipulate expressions to make equivalent expressions while problem solving. I can 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. I can compare an algebraic solution to an arithmetic solution. I can 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. I can graph the solution set of the inequality.		substitution inequality properties of inequality (CCSS - Table 5) algebraic solution arithmetic solution solution set	**Teach 21 (Expressions):** http://wveis.k12.wv.us/Teach21/public/ng_unit_plans/UPview.cfm?action=V&tsele1=2&tsele2=23&upid=605			

	solution to an arithmetic solution, identifying the sequence of the operations used in each approach. **b.** 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.	I can interpret the solution set in relation to the problem						
	M.7.RP.1 compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. **M.7.RP.2** recognize and represent proportional relationships between quantities. **a.** 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	I can compute unit rates with ratios of fractions. I can compute unit rates with ratios of lengths, areas, and other quantities. I can compute unit rates with ratios measured in like or different units. I can determine if two quantities are proportional using a variety of methods (table, graphs, diagrams, equations, or	How can ratios of fractions and quantities measured in like or different units be expressed as unit rates? How can proportional relationships be represented?	ratio unit rate equivalent ratio proportion proportional relationship cross-product constant of proportionality coordinate plane origin axes (x-axis,				

	through the origin. **b.** identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams and verbal descriptions of proportional relationships. **c.** 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**.* **d.** 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. **M.7.RP.3** 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.*	verbal description). I can identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams and verbal descriptions of proportional relationships. I can represent a proportional relationship in an equation. I can explain the meaning of a point (*x*, *y*) on the graph of a proportional relationship. I can identify the unit rate by using the point (1, *r*). I can explain the meaning of the point (0,0) on the graph of a proportional relationship. I can use a proportional relationship to solve multi-step ratio and percent problems.	What are the properties of a proportional relationship and how can they be identified? How can these properties be identified when the relationship is modeled in various ways? How can a proportional relationship be represented by an equation? How can specific coordinates be used to determine the unit rate? How can proportional relationships be used to solve percent and ratio problems?	y-axis) x-coordinate y-coordinate ordered pair quadrant percent mark-ups/downs simple interest tax gratuity commissions discounts percent increase percent decrease percent error				

	M.7.SP.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. **M.7.SP.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. *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.* **M.7.SP.7** develop a probability	I can recognize that probability of a chance event is a number between 0 and 1. I can recognize the likelihood of an event occurring based on the probability between 0 and 1. I can recognize that probability may be expressed as a decimal, percent, or ratio. I can collect data from an experiment. I can predict the number of times an event will occur given a specific number of trials. I can explain why theoretical probability will not always be equal to the experimental probability. I can recognize that as the number of trials increase the experimental probability	How is the likelihood of an event expressed as a probability? How can probability be used to approximate the frequency of a chance event? How can probability be used to make predictions about uncertain events?	probability event likely event unlikely event relative frequency theoretical probability experimental probability outcome simple event compound event tree diagram simulation sample space				

	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. **a.** 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.* **b.** 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*	approaches the theoretical probability. I can develop a uniform probability model and determine the probability of the event from that model. I can conduct an experiment and develop an experimental probability model to represent the situation. I can extend the principles of probability of simple events to compound events. I can represent sample spaces for compound events using multiple methods such as	How can the outcomes of a compound event be represented visually? How can probability be determined from the visual representation?					

	the observed frequencies? **M.7.SP.8** find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. **a.** 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. **b.** 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. **c.** 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,*	organized lists, tables and tree diagrams. I can find the probability of compound events based on the sample space. I can design and use a simulation to generate frequencies for compound events. I can find the probability of compound events based on the simulation. I can examine a sample of a population to gain information about the population.	How can random sampling be used to gain and generalize information about a population? How does generating multiple random samples assist in drawing inferences about a population?	statistics population valid sample random sample representative sample space inference prediction visual overlap data distribution statistical variability measure of center (mean, median) measures of variability mean absolute	**Teach 21 (Probability):** http://wveis.k12.wv.us/Teach21/public/ng_unit_plans/U_menu.cfm?tsele1=2			

	what is the probability that it will take at least 4 donors to find one with type A blood? **M.7.SP.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. **M.7.SP.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. *For example, estimate the mean word length in a book by*	I can recognize generalizations about a population from a sample are valid only if the sample is representative of that population. I can produce representative samples by using random sampling to support valid inferences of the population. I can use data from a random sample to draw inferences about a population with an unknown characteristic of interest. I can generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. I can compare the centers (mean and median) or mode of two different data	How can data distributions be used to measure variability? How can the measures of center and variability be used to compare two populations?	deviation range spread interquartile range				

	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. **M.7.SP.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. **M.7.SP.4** 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*	sets. I can assess the similarities and differences between two data sets. I can compare differences related to the mean absolute deviation or interquartile range of two data sets. I can compare two populations by using the centers (means and/or medians) of data collected from random samples. I can compare two populations by using the measures of variability (mean absolute deviation and/or interquartile range) of data collected from random samples.						

	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.							
	M.7.G.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. **M.7.G.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. **M.7.G.3** describe the two-dimensional figures that result from slicing three-dimensional figures, as in	I can solve problems involving scale drawings of geometric figures. I can compute the actual length and the actual area of a geometric figure from a scale drawing. I can reproduce a scale drawing at a different scale. I can draw geometric shapes from given conditions using multiple methods. I can construct triangles from three measures of angles or sides. I can determine if the given measures of angles or sides produce a unique triangle, more than	How do scale drawings assist in determining and displaying real-life measurements? How do the given conditions affect the drawing of a geometric shape? What two-dimensional figures are formed by slicing a three-dimensional figure?	scale scale factor scale drawings area polygon protractor construct similar congruent types of triangles quadrilaterals two-dimensional three-dimensional plane section (cross-	**Alien Angles:** http://www.mathplayground.com/alienangles.html (Angle Measurement Practice)			

	plane sections of right rectangular prisms and right rectangular pyramids. **M.7.G.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. **M.7.G.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. **M.7.G.6** solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals,	one triangle, or no triangle. I can describe the two-dimensional figure that results from slicing a three dimensional figure. I can derive the formula for the circumference and area of a circle and describe the relationship between the two. I can use the formula for the circumference and area of a circle to solve problems I can determine the radius and diameter of a circle when the area or circumference is known. I can state relationships between supplementary, complementary, vertical, and adjacent angles. I can use facts about angles in a multi-	How can the formulas for area and circumference of a circle be derived and used to solve problems? How can the properties of angles be used in multi-step problems to solve simple equations? How can area, surface area, and volume be used to solve real-world problems?	section) rectangular prism rectangular pyramid parallel perpendicular radius diameter pi circumference area formulas types of angles (supplementary, complementary, vertical, adjacent) surface area volume cube prism				

	polygons, cubes, and right prisms.	step problem to write and solve simple equations for an unknown angle in a figure. I can solve mathematical and real-world problems involving area, volume, and surface area.						