Mathletics
Missouri Learning Standards

Activities (Courses) and Skill Quests

Grades 7-8

September, 2025

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Grade 7

7.RP Ratios and Proportional Relationships
7.RP.A Analyze proportional relationships and use them to solve problems.

7.RP.A.1	
Compute unit rates, including those that involve complex fractions, with like or different units.	
Course Topics	**Activities**
RP- Ratios & Proportional Relationships	Rates
	Proportional Relationships
	Rate Word Problems
	Average Speed
	Time Taken
Topics	**Skill Quests**
Unit rates with fractions	Solving unit rate problems involving fractions

7.RP.A.2a	
Recognize and represent proportional relationships between quantities. Determine when two quantities are in a proportional relationship.	
Course Topics	**Activities**
RP- Ratios & Proportional Relationships	y=ax
Topics	**Skill Quests**
Identify proportional relationships	Identifying proportional relationships

7.RP.A.2b	
Recognize and represent proportional relationships between quantities. Identify and/or compute the constant of proportionality (unit rate).	
Course Topics	**Activities**
RP- Ratios & Proportional Relationships	y=ax
Topics	**Skill Quests**
Constant of proportionality	Identifying the constant of proportionality

7.RP.A.2c	
Recognize and represent proportional relationships between quantities. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Graphs of proportional relationships	Interpreting graphs of proportional relationships

7.RP.A.2d
Recognize and represent proportional relationships between quantities. Recognize that the graph of any proportional relationship will pass through the origin.

Course Topics	Activities
Teacher directed	

Topics	Skill Quests
Teacher directed	

7.RP.A.3
Solve problems involving ratios, rates, percentages and proportional relationships.

Course Topics	Activities
RP- Ratios & Proportional Relationships	Conversion Graphs
	Best Buy
	Commission
	Percent Increase and Decrease
	Percentage Error
	Successive Discounts
	Profit and Loss
	Simple Interest
	Rates Calculations

Topics	Skill Quests
Ratio & percent problems	Solving multi-step ratio & percent problems

7.NS Number Sense and Operations
7.NS.A Apply and extend previous understandings of operations to add, subtract, multiply and divide rational numbers.

7.NS.A.1
Apply and extend previous understandings of numbers to add and subtract rational numbers. a) Add and subtract rational numbers. b) Represent addition and subtraction on a horizontal or vertical number line. c) Describe situations and show that a number and its opposite have a sum of 0 (additive inverses). d) Understand subtraction of rational numbers as adding the additive inverse. e) Determine the distance between two rational numbers on the number line is the absolute value of their difference. f) Interpret sums and differences of rational numbers.

Course Topics	Activities
NS- The Number System	Add Unlike Fractions
	Add Mixed Numbers: Signs Can Differ
	Subtract Unlike Fractions
	Subtract Mixed Numbers: Signs Differ
	Subtract Negative Mixed Numbers

Topics	Skill Quests
Add & subtract rational numbers	Describing situations involving opposites
	Opposites & absolute value
	Adding rational numbers
	Adding positive & negative fractions
	Adding positive & negative decimals

	Adding integers
	Subtracting rational numbers: adding the inverse
	Subtracting positive & negative fractions
	Subtracting positive & negative decimals
	Subtracting integers
	Subtracting rational numbers: absolute value
	Adding & subtracting rational numbers: properties

7.NS.A.2

Apply and extend previous understandings of numbers to multiply and divide rational numbers. a) Multiply and divide rational numbers. b) Determine that a number and its reciprocal have a product of 1 (multiplicative inverse). c) Understand that every quotient of integers (with non-zero divisor) is a rational number. d) Convert a rational number to a decimal. e) Understand that all rational numbers can be written as fractions or decimal numbers that terminate or repeat. f) Interpret products and quotients of rational numbers by describing real-world contexts.

Course Topics	Activities
NS- The Number System	Multiply Fraction by Whole Number
	Multiply Two Fractions 2
	Divide Whole Number by Fraction
	Divide Fractions by Fractions 2
	Divide Mixed Numbers with Signs
	Using Reciprocals
	Fractions to Decimals 2
	Fraction to Terminating Decimal

Topics	Skill Quests
Multiply & divide rational numbers	Multiplying rational numbers
	Multiplying positive & negative fractions
	Multiplying positive & negative decimals
	Multiplying integers
	Products of rational numbers: real-world contexts
	Dividing integers
	Quotients of rational numbers: real-world contexts
	Multiply & divide rational numbers: properties

7.NS.A.3

Solve problems involving the four arithmetic operations with rational numbers.

Course Topics	Activities
NS- The Number System	More Fraction Problems

Topics	Skill Quests
Rational numbers problems: 4 operations	Rational numbers problems: 4 operations

7.EEI Expressions, Equations and Inequalities

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

7.EEI.A.1	
Apply properties of operations to simplify and to factor linear algebraic expressions with rational coefficients.	
Course Topics	**Activities**
EEI- Expressions & Equations	Using the Distributive Property
	Factoring
Topics	**Skill Quests**
Linear expressions: properties	Simplifying algebraic expressions: add & subtract
	Distributive property: algebraic expressions
	Factoring algebraic expressions

7.EEI.A Solve problems using numerical and algebraic expressions and equations.

7.EEI.A.2	
Understand how to use equivalent expressions to clarify quantities in a problem.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Interpret expressions	Rearranging expressions to interpret quantities

7.EEI.B Solve problems using numerical and algebraic expressions and equations.

7.EEI.B.3a	
Solve multi-step problems posed with rational numbers.	
Course Topics	**Activities**
EEI- Expressions & Equations	Decimals to Percentages
	Percentages to Decimals
	Percentages greater than 100% to Mixed Numerals
	Mixed Numerals to Percentages greater than 100%
Topics	**Skill Quests**
Problems with rational numbers	Solving problems with rational numbers
	Converting terminating decimals

7.EEI.B.3b	
Assess the reasonableness of answers using mental computation and estimation strategies.	
Course Topics	**Activities**
EEI- Expressions & Equations	Estimate Decimal Operations
	Estimate Products with Fractions
Topics	**Skill Quests**
Teacher directed	

7.EEI.B Write and/or solve linear equations and inequalities in one variable.

7.EEI.B.4a	
Write and/or solve equations of the form x+p = q and px = q in which p and q are rational numbers.	
Course Topics	**Activities**
EEI- Expressions & Equations	Solve Equations: Add, Subtract 2
	Solve Equations: Multiply, Divide 2
	Solve One-Step Equations
	Writing Equations
	Write an Equation: Word Problems
Topics	**Skill Quests**
Teacher directed	

7.EEI.B.4b	
Write and/or solve two-step equations of the form px + q = r and p(x + q) = r, where p, q and r are rational numbers, and interpret the meaning of the solution in the context of the problem.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Solve 2-step equations	Solving 2-step equations: word problems
	2-step equations, positive integer coefficients
	2-step equations, integer coefficients
	2-step equations, positive rational coefficients
	2-step equations, rational coefficients
	2-step equations, distributive property

7.EEI.B.4c	
Write, solve and/or graph inequalities of the form px + q > r or px + q < r, where p, q and r are rational numbers.	
Course Topics	**Activities**
EEI- Expressions & Equations	Solve One-Step Inequalities 1
	Solve One-Step Inequalities 2
	Inequalities on a Number Line: Mixed Basics
	Graphing Inequalities on Number Line
Topics	**Skill Quests**
Solve 2-step inequalities	Creating & solving 2-step inequalities
	Representing inequalities
	Graphing the solution of an inequality
	Solving 2-step inequalities

7.GM Geometry and Measurement
7.GM.A Draw and describe geometrical figures and describe the relationships between them.

7.GM.A.1
Solve problems involving scale drawings of real objects and geometric figures, including computing actual lengths and areas from a scale drawing and reproducing the drawing at a different scale.

Course Topics	Activities
GM- Geometry 1 - 4	Scale Measurement
	Scale Factor
	Floor Plans
	Perimeter, Area, Dimension Change
Topics	**Skill Quests**
Scale drawings	Scale drawings

7.GM.A Use a variety of tools to construct geometric shapes.

7.GM.A.2a	
Use a variety of tools to construct geometric shapes. Determine if provided constraints will create a unique triangle through construction.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Construct triangles	Triangle inequality theorem
	Constructing triangles with given conditions

7.GM.A.2b	
Use a variety of tools to construct geometric shapes. Construct special quadrilaterals given specific parameters.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

7.GM.A Draw and describe geometrical figures and describe the relationships between them.

7.GM.A.3	
Describe two-dimensional cross sections of pyramids, prisms, cones and cylinders.	
Course Topics	**Activities**
GM- Geometry 1 - 4	Relate Shapes and Solids
Topics	**Skill Quests**
Cross sections of 3-D figures	Describing cross sections of 3-D figures

7.GM.A Understand the concepts of circles.

7.GM.A.4a	
Understand the concepts of circles. Analyze the relationships among the circumference, the radius, the diameter, the area and Pi in a circle.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Introduce parts of a circle	Introducing the parts of a circle

7.GM.A.4b
Understand the concepts of circles. Know and apply the formulas for circumference and area of circles to solve problems.

Course Topics	Activities
GM- Geometry 1 - 4	Calculate Circumference of Circles
	Area: Circles 2
	Area: Annulus
Topics	**Skill Quests**
Circles: area & circumference	Finding the area of a circle
	Finding the circumference of a circle

7.GM.B Apply and extend previous understanding of angle measure, area and volume.

7.GM.B.5
Use angle properties to write and solve equations for an unknown angle.

Course Topics	Activities
GM- Geometry 4-6	Equal, Complement, or Supplement?
	Vertically Opposite: Value of x
	Angles of Revolution: Value of x
Topics	**Skill Quests**
Use angle facts to solve problems	Supplementary angles
	Complementary angles
	Adjacent angles
	Vertical angles

7.GM.B Understand the relationship between area, surface area and volume.

7.GM.B.6a
Find the area of triangles, quadrilaterals and other polygons composed of triangles and rectangles.

Course Topics	Activities
GM- Geometry 4-6	Area: Triangles
	Area: Squares and Rectangles
	Area: Parallelograms
	Area: Quadrilaterals
	Area: Compound Figures
Topics	**Skill Quests**
Area, volume & surface area	Area: polygons
	Solving real-life problems: area of polygons

7.GM.B.6b
Find the volume and surface area of prisms, pyramids and cylinders.

Course Topics	Activities
GM- Geometry 4-6	Surface Area: Cylinders
	Surface Area: Square Pyramids
	Volume of Triangular Prisms

Topics	Skill Quests
	Volume: Prisms
	Volume: Pyramids
	Volume: Cylinders
Topics	**Skill Quests**
Volume & surface area	Volume: right prisms
	Surface area: rectangular & triangular prisms

7.DSP Data Analysis, Statistics and Probability
7.DSP.A Use random sampling to draw inferences about a population.

7.DSP.A.1a	
Understand that a sample is a subset of a population.	
Course Topics	**Activities**
DSP - Data Analysis, Statistics & Probability	Methods of Data Sampling
Topics	**Skill Quests**
Understand sampling	Understanding sampling

7.DSP.A.1b	
Understand that generalizations from a sample are valid only if the sample is representative of the population.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Draw inferences from samples	Drawing inferences from samples

7.DSP.A.1c	
Understand that random sampling is used to produce representative samples and support valid inferences.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Random sampling	Random sample to produce representative samples

7.DSP.A.2	
Use data from multiple samples to draw inferences about a population and investigate variability in estimates of the characteristic of interest.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Inferences about populations	Making inferences about populations

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

7.DSP.B.3	
Analyze different data distributions using statistical measures.	
Course Topics	**Activities**
DSP - Data Analysis, Statistics & Probability	Mean
	Median
	Mode
	Data Extremes and Range
Topics	**Skill Quests**
Compare data distributions	Comparing data distributions

7.DSP.B.4	
Compare the numerical measures of center, measures of frequency and measures of variability from two random samples to draw inferences about the population.	
Course Topics	**Activities**
DSP - Data Analysis, Statistics & Probability	Probability Tables
Topics	**Skill Quests**
Draw comparative inferences	Drawing comparative inferences

7.DSP.C Investigate the probability of chance events.

7.DSP.C.5a	
Determine probabilities of simple events.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Determine probabilities of simple events	Determining probabilities of simple events

7.DSP.C.5b	
Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Introduction to probability	Introducing probability

7.DSP.C Investigate the relationship between theoretical and experimental probabilities for simple events.

7.DSP.C.6a	
Predict outcomes using theoretical probability.	
Course Topics	**Activities**

DSP - Data Analysis, Statistics & Probability	Probability Scale
	Introductory Probability
	Find the Probability
	Chance Dial

Topics	Skill Quests
Probability of chance events	Probability of chance events: relative frequency

7.DSP.C.6b Perform experiments that model theoretical probability.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

7.DSP.C.6c Compare theoretical and experimental probabilities.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

7.DSP.C Explain possible discrepancies between a developed probability model and observed frequencies.

7.DSP.C.7a Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Determine the probability of events	Theoretical probability
	Predicting outcomes of chance experiments
	Finding the complement of an event

7.DSP.C.7b Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Observe frequencies in data	Finding the approximate probability
	Comparing observed frequency & expected frequency

7.DSP.C Find probabilities of compound events using organized lists, tables, tree diagrams and simulations.

7.DSP.C.8a	
Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. Represent the sample space of a compound event.	
Course Topics	**Activities**
DSP - Data Analysis, Statistics & Probability	Counting Principle
	Counting Techniques 1
	Dice and Coins
	Probability - Replacement
	Probability - No Replacement
Topics	**Skill Quests**
Probability: compound events	Investigating mutually exclusive events
	Calculating probabilities of compound events
	Representing sample spaces & identifying outcomes

7.DSP.C.8b	
Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. Design and use a simulation to generate frequencies for compound events.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Independent & dependent compound events	Independent & dependent compound events

Grade 8

8.NS Number Sense and Operations
8.NS.A Know that there are numbers that are not rational, and approximate them by rational numbers.

8.NS.A.1a	
Explore the real number system. Know the differences between rational and irrational numbers.	
Course Topics	**Activities**
NS- The Number System	Irrational Numbers
Topics	**Skill Quests**
Rational & irrational numbers	Classifying rational & irrational numbers

8.NS.A.1b	
Explore the real number system. Understand that all rational numbers have a decimal expansion that terminates or repeats.	
Course Topics	**Activities**
NS- The Number System	Fraction to Terminating Decimal
Topics	**Skill Quests**
Repeating & terminating decimals	Repeating & terminating decimals as fractions

8.NS.A.1c	
Explore the real number system. Convert decimals which repeat into fractions and fractions into repeating decimals.	
Course Topics	**Activities**
NS- The Number System	Repeated Decimals
Topics	**Skill Quests**
Convert repeating decimals to fractions	Converting repeating decimals to fractions

8.NS.A.1d	
Explore the real number system. Generate equivalent representations of rational numbers.	
Course Topics	**Activities**
NS- The Number System	Fraction to Terminating Decimal
Topics	**Skill Quests**
Fraction & decimal equivalence	Fraction & decimal equivalence

8.NS.A.2	
Estimate the value and compare the size of irrational numbers and approximate their locations on a number line.	
Course Topics	**Activities**
NS- The Number System	Estimating Square Roots

Topics	Skill Quests
Approximate irrational numbers	Comparing irrational numbers
	Locating irrational numbers on a number line
	Approximating the value of an irrational number
	Finding square roots of non-perfect squares

8.EEI Expressions, Equations and Inequalities
8.EEI.A Know that there are numbers that are not rational, and approximate them by rational numbers.

8.EEI.A.1	
Know and apply the properties of integer exponents to generate equivalent expressions.	
Course Topics	**Activities**
EEI- Expressions & Equations 1-4	Exponent Form to Numbers
	Exponent Notation
	The Zero Exponent
	Negative Exponents
	Integer Exponents
	Simplifying with Exponent Laws 1
Topics	**Skill Quests**
Properties of integer exponents	Using exponent notation
	Product of powers, numerical base
	Product of powers, algebraic base
	Quotient of powers, numerical base
	Quotient of powers, algebraic base
	Power of a power, numerical base
	Power of a power, algebraic base
	Zero exponents, numerical base
	Zero exponents, algebraic base
	Negative exponents, numerical base
	Negative exponents, algebraic base
	Simplifying expressions, numerical base
	Simplifying expressions, algebraic base

8.EEI.A.2a	
Investigate concepts of square and cube roots. Solve equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

8.EEI.A.2b	
Investigate concepts of square and cube roots. Evaluate square roots of perfect squares less than or equal to 625 and cube roots of perfect cubes less than or equal to 1000.	
Course Topics	**Activities**

EEI- Expressions & Equations 1-4	Square Roots 1
	Square Roots
Topics	**Skill Quests**
Square & cube roots	Investigating square roots & cube roots
	Squares & square roots
	Square roots of fractions & decimals
	Cubes & cube roots

8.EEI.A.2c	
Investigate concepts of square and cube roots. Recognize that square roots of non-perfect squares are irrational.	
Course Topics	**Activities**
EEI- Expressions & Equations 1-4	Estimate Square Roots
	Estimating Cube Roots
Topics	**Skill Quests**
Teacher directed	

8.EEI.A.3	
Express very large and very small quantities in scientific notation and approximate how many times larger one is than the other.	
Course Topics	**Activities**
EEI- Expressions & Equations 1-4	Scientific Notation 1
	Scientific Notation 2
	Scientific notation to decimal
	Ordering Scientific Notation
Topics	**Skill Quests**
Write numbers in scientific notation	Introducing scientific notation
	Converting scientific notation to standard form
	Converting standard form to scientific notation

8.EEI.A.4	
Use scientific notation to solve problems: a) Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used; b) Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Calculations in scientific notation	Calculations in scientific notation

8.EEI.B Understand the connections between proportional relationships, lines and linear equations.

8.EEI.B.5a
Graph proportional relationships. Interpret the unit rate as the slope of the graph.

Course Topics	Activities
EEI- Expressions & Equations 5-6	y=ax
Topics	**Skill Quests**
Graph proportional relationships	Graphing proportional relationships

8.EEI.B.5b
Graph proportional relationships. Compare two different proportional relationships.

Course Topics	Activities
Teacher directed	
Topics	**Skill Quests**
Compare proportional relationships	Comparing proportional relationships

8.EEI.B.6a
Apply concepts of slope and y-intercept to graphs, equations and proportional relationships. Explain why the slope (m) is the same between any two distinct points on a non-vertical line in the Cartesian coordinate plane.

Course Topics	Activities
EEI- Expressions & Equations 5-6	Slope of a Line
Topics	**Skill Quests**
Understand slope	Using similar triangles to understand slope

8.EEI.B.6b
Apply concepts of slope and y-intercept to graphs, equations and proportional relationships. 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.

Course Topics	Activities
EEI- Expressions & Equations 5-6	Equation of a Line 1
	Which Straight Line?
Topics	**Skill Quests**
Write the equation of a line	Writing the equation of a line
Identify the slope & y-intercept	Identifying the slope in an equation or graph
	Identifying the y-intercept on a graph
	Finding the y-intercept algebraically
Graph equations	Graphing equations in slope-intercept form
	Graphing equations not in slope-intercept form

8.EEI.C Analyze and solve linear equations and inequalities and pairs of simultaneous linear equations.

8.EEI.C.7a	
Solve linear equations and inequalities in one variable. Create and identify linear equations with one solution, infinitely many solutions or no solutions.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Solution types of linear equations	Solution types of linear equations

8.EEI.C.7b	
Solve linear equations and inequalities in one variable. Solve linear equations and inequalities with rational number coefficients, including equations and inequalities whose solutions require expanding expressions using the distributive property and combining like terms.	
Course Topics	**Activities**
EEI- Expressions & Equations 7-8	Solve Multi-Step Equations
	Equations with Fractions
	Equations with Decimals
	Equations: Variables, Both Sides
	Equations to Solve Problems
	Solve Two-Step Inequalities
	Graphing Inequalities 2
	Solving Inequalities 2
Topics	**Skill Quests**
Solve linear equations	Solving 3-step linear equations
	Solving linear equations, variables on both sides
	Solving linear equations, distributive property
	Using substitution to check solutions
Solve linear inequalities	Solving 1-step linear inequalities
	Solving 2-step linear inequalities
	Solving inequalities with variables on both sides

8.EEI.C.8a	
Analyze and solve systems of linear equations. Graph systems of linear equations and recognize the intersection as the solution to the system.	
Course Topics	**Activities**
EEI- Expressions & Equations 7-8	Solve Systems by Graphing
	Simultaneous Linear Equations
Topics	**Skill Quests**
Graph systems of equations	Graphing systems of equations

8.EEI.C.8b
Analyze and solve systems of linear equations. Explain why solution(s) to a system of two linear equations in two variables correspond to point(s) of intersection of the graphs.

Course Topics	Activities
Teacher directed	
Topics	**Skill Quests**
Identify solutions, systems of equations	Identifying solutions, systems of equations

8.EEI.C.8c	
Analyze and solve systems of linear equations. Explain why systems of linear equations can have one solution, no solution or infinitely many solutions.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Teacher directed	

8.EEI.C.8d	
Analyze and solve systems of linear equations. Solve systems of two linear equations.	
Course Topics	**Activities**
EEI- Expressions & Equations 7-8	Simultaneous Equations 2
	Simultaneous Equations 1
	Simultaneous Linear Equations
Topics	**Skill Quests**
Solve systems of equations	Solving systems of equations graphically
	Solving systems of equations using elimination
	Solving systems of equations using substitution
	Checking the solution of a system of equations
	Writing & solving systems of equations

8.GM Geometry and Measurement
8.GM.A Understand congruence and similarity using physical models, transparencies or geometry software.

8.GM.A.1a	
Verify experimentally the congruence properties of rigid transformations. Verify that angle measure, between, collinearity and distance are preserved under rigid transformations.	
Course Topics	**Activities**
GM- Geometry 1-4	Congruent Figures (Dot Grid)
	Congruent Figures (Grid)
Topics	**Skill Quests**
Introduction to rigid transformations	Translating points on the coordinate plane
	Reflecting points across the x- or y-axis
	Rotating points about the origin
Preserved properties	Preserved properties: length
	Preserved properties: angles
	Preserved properties: parallel lines

8.GM.A.1b

Verify experimentally the congruence properties of rigid transformations. Investigate if orientation is preserved under rigid transformations.

Course Topics	Activities
Teacher directed	

Topics	Skill Quests
Teacher directed	

8.GM.A.2a

Understand that two-dimensional figures are congruent if a series of rigid transformations can be performed to map the pre-image to the image: a) Describe a possible sequence of rigid transformations between two congruent figures.

Course Topics	Activities
Teacher directed	

Topics	Skill Quests
Congruency: rigid transformations	Congruency: rigid transformations

8.GM.A.3

Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.

Course Topics	Activities
GM- Geometry 1-4	Transformations: Coordinate Plane
	Rotations: Coordinate Plane
	Scale Factor

Topics	Skill Quests
Transformations, coordinates	Dilations, coordinates
	Translations, coordinates
	Rotations, coordinates
	Reflections, coordinates
	Sequences of transformations

8.GM.A.4

Understand that two-dimensional figures are similar if a series of transformations (rotations, reflections, translations and dilations) can be performed to map the pre-image to the image: a) Describe a possible sequence of transformations between two similar figures.

Course Topics	Activities
Teacher directed	

Topics	Skill Quests
Similarity: transformations	Introducing similarity
	Similarity: transformations

8.GM.A.5a

Explore angle relationships and establish informal arguments. Derive the sum of the interior angles of a triangle.

Course Topics	Activities
GM- Geometry 1-4	Angle Measures in a Triangle
Topics	**Skill Quests**
Angle sum theorem	Angle sum theorem

8.GM.A.5b
Explore angle relationships and establish informal arguments. Explore the relationship between the interior and exterior angles of a triangle.

Course Topics	Activities
GM- Geometry 1-4	Exterior Angles of a Triangle
Topics	**Skill Quests**
Exterior angle theorem	Exterior angle theorem

8.GM.A.5c
Explore angle relationships and establish informal arguments. Construct and explore the angles created when parallel lines are cut by a transversal.

Course Topics	Activities
GM- Geometry 1-4	Introduction to Angles on Parallel Lines 1
	Parallel Lines
	Vertically Opposite: Value of x
	Angles on Parallel Lines
Topics	**Skill Quests**
Angle relationships	Angle relationships: parallel lines, transversal

8.GM.A.5d
Explore angle relationships and establish informal arguments. Use the properties of similar figures to solve problems.

Course Topics	Activities
GM- Geometry 1-4	Similar Figures 1
	Using Similar Triangles
Topics	**Skill Quests**
Problems involving similar figures	Using scale to analyze similar triangles
	Identifying similar triangles

8.GM.B Understand and apply the Pythagorean Theorem.

8.GM.B.6
Use models to demonstrate a proof of the Pythagorean Theorem and its converse.

Course Topics	Activities
GM- Geometry 5-8	Pythagorean Triads
Topics	**Skill Quests**
The Pythagorean Theorem & its converse	Identifying the hypotenuse, right triangles
	Identifying right triangles, Pythagorean Theorem
	Pythagorean triples

8.GM.B.7	
Use the Pythagorean Theorem to determine unknown side lengths in right triangles in problems in two- and three-dimensional contexts.	
Course Topics	**Activities**
GM- Geometry 5-8	Pythagorean: Find a Short Side (integers only)
	Pythagorean: Find a Short Side (decimal values)
	Pythagorean Theorem
	Find Slant Height
Topics	**Skill Quests**
Apply the Pythagorean Theorem	Pythagorean Theorem: missing short side
	Pythagorean Theorem: missing hypotenuse
	Pythagorean Theorem: missing side
	Pythagorean Theorem in 2-D & 3-D

8.GM.B.8	
Use the Pythagorean Theorem to find the distance between points in a Cartesian coordinate system.	
Course Topics	**Activities**
GM- Geometry 5-8	Distance Between Two Points
Topics	**Skill Quests**
Distance between two points	Finding the distance between two points

8.GM.C Solve problems involving volume of cones, pyramids and spheres.

8.GM.C.9a	
Solve problems involving surface area and volume. Understand the concept of surface area and find surface area of pyramids.	
Course Topics	**Activities**
GM- Geometry 5-8	Surface Area: Square Pyramids
	Surface Area: Rectangular Pyramids
Topics	**Skill Quests**
Surface area	Surface area: pyramids

8.GM.C.9b	
Solve problems involving surface area and volume. Understand the concepts of volume and find the volume of pyramids, cones and spheres.	
Course Topics	**Activities**
GM- Geometry 5-8	Volume: Pyramids
	Volume: Cones
	Volume: Spheres
Topics	**Skill Quests**
Volume	Volume: pyramids
	Volume: cones
	Volume: spheres

8.DSP Data Analysis, Statistics and Probability
8.DSP.A Investigate patterns of association in bivariate data.

8.DSP.A.1	
Construct and interpret scatter plots of bivariate measurement data to investigate patterns of association between two quantities.	
Course Topics	**Activities**
DSP - Data Analysis, Statistics & Probability	Data Analysis: Scatter Plots
	Scatter Plots
Topics	**Skill Quests**
Use & interpret scatter plots	Using & interpreting scatter plots

8.DSP.A.2	
Generate and use a trend line for bivariate data, and informally assess the fit of the line.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Estimate the line of best fit	Estimating the line of best fit

8.DSP.A.3	
Interpret the parameters of a linear model of bivariate measurement data to solve problems.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Interpret the line of best fit	Interpreting the line of best fit

8.DSP.A.4a	
Interpret the parameters of a linear model of bivariate measurement data to solve problems. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Construct & interpret two-way tables	Constructing & interpreting two-way tables

8.DSP.A.4b	
Interpret the parameters of a linear model of bivariate measurement data to solve problems. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Calculate relative frequency	Calculating relative frequency

8.F Functions
8.F.A Define, evaluate and compare functions.

8.F.A.1	
Explore the concept of functions. (The use of function notation is not required.)	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Identify functions	Identifying functions

8.F.A.1a	
Explore the concept of functions. (The use of function notation is not required.). Understand that a function assigns to each input exactly one output.	
Course Topics	**Activities**
F- Functions	Function Rules and Tables
	Vertical Line Test
	Find the Function Rule
Topics	**Skill Quests**
Understand functions	Understanding functions

8.F.A.1b	
Explore the concept of functions. (The use of function notation is not required.) Determine if a relation is a function.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Identify functions	Identifying functions

8.F.A.1c	
Explore the concept of functions. (The use of function notation is not required.) Graph a function.	
Course Topics	**Activities**
F- Functions	Graphing from a Table of Values 2
Topics	**Skill Quests**
Graph a function	Graphing a function

8.F.A.2	
Compare characteristics of two functions each represented in a different way.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Compare functions	Comparing functions

8.F.A.3a
Investigate the differences between linear and nonlinear functions. Interpret the equation y = mx + b as defining a linear function, whose parameters are the slope (m) and the y-intercept (b).

Course Topics	Activities
F- Functions	Non Linear Graphs
Topics	**Skill Quests**
Represent linear relationships	Representing linear relationships

8.F.A.3b
Investigate the differences between linear and nonlinear functions. Recognize that the graph of a linear function has a constant rate of change.

Course Topics	Activities
F- Functions	What Type of Function?
Topics	**Skill Quests**
Teacher directed	

8.F.A.3c
Investigate the differences between linear and nonlinear functions. Give examples of nonlinear functions.

Course Topics	Activities
F- Functions	What Type of Function?
	Non Linear Graphs
	Identifying Graphs
Topics	**Skill Quests**
Linear & nonlinear functions	Equations of linear & non-linear relationships

8.F.B Use functions to model relationships between quantities.

8.F.B.4a
Use functions to model linear relationships between quantities. Explain the parameters of a linear function based on the context of a problem.

Course Topics	Activities
F- Functions	Modeling Linear Relationships
Topics	**Skill Quests**
Teacher directed	

8.F.B.4b
Use functions to model linear relationships between quantities. Determine the parameters of a linear function.

Course Topics	Activities
F- Functions	Modeling Linear Relationships
Topics	**Skill Quests**
Rate of change & initial value	Rate of change & initial value

8.F.B.4c	
Use functions to model linear relationships between quantities. Determine the x-intercept of a linear function.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Determine the x-intercept	Determining the x-intercept

8.F.B.5	
Describe the functional relationship between two quantities from a graph or a verbal description.	
Course Topics	**Activities**
Teacher directed	
Topics	**Skill Quests**
Distance–time graphs	Distance–time graphs

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