High School Math Solution Integrated Math 1 **MATHia**® Table of Contents
2020-2021 School Year

CARNEGIE LEARNING

1	Searching for Patterns					Strategies									
MATHia Unit	**MATHia Workspace**	**Overview**	**CCSS**	**Concept Builder**	**Mastery**	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Topic 1 Quantities and Relationships															
Understanding Quantities and Their Relationships	Identifying Quantities	Students answer questions related to two animations--one discussing dependent and independent quantities and slope in a real-world context, and the other investigating the shapes of graphs of functions which show the linear and non-linear relationships between different quantities in real-world contexts. Students study numberless graphs of functions and match the graphs to various situations.	N.Q.2	✓			•	•						•	•
Recognizing Functions and Function Families	Evaluating Linear Functions	Given a function in function notation, students determine input and output values.	F.IF.2		✓						•				
	Identifying Domain and Range	Students are introduced to domain and range. They analyze the domain and range of functions in multiple representations. Students identify the domain and range of graphed functions. They identify the mathematical and contextual domain and range of functions represented by scenarios and by graphs.	F.IF.5	✓				•						•	•
	Identifying Key Characteristics of Graphs of Functions	Students will identify key characteristics from the graph of a function, such as the intercepts, minimum and maximum x-values, minimum and maximum y-values, domain, and range.	F.IF.1		✓				•						
	Introduction to Function Families	Students answer questions related to an animation describing different function families (linear, quadratic, exponential, absolute value), their graphs, equations, and general characteristics. Students then investigate the graphs and characteristics of linear, exponential, quadratic, and linear absolute functions in more detail.	F.IF.1	✓			•	•			•				•

1 Searching for Patterns

Topic 2 Sequences

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Recognizing Patterns and Sequences	Describing Patterns in Sequences	Students determine the patterns in sequences and determine the next terms in sequences.	F.IF.3		✓										
	Graphs of Sequences	Students sort numeric sequences by whether they are arithmetic, geometric, or neither. They analyze the characteristics of graphs of arithmetic and geometric sequences. Students match graphs of sequences to their numeric representations.	F.IF.3	✓				•							
Determinig Recursive and Explicit Expressions	Writing Recursive Formulas	Students determine if sequences are arithmetic or geometric and determine recursive formulas for the sequences.	F.IF.3 F.BF.1a		✓										
	Writing Explicit Formulas	Students determine if sequences are artihmetic or geometric and develop the explicit formulas for the sequences.	F.BF.1a		✓										

Topic 3 Linear Regressions

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Least Squares Regression	Exploring Linear Regression	Students use an interactive Explore Tool to investigate linear regression functions. Students enter data related to various real-world contexts and use the Explore Tool to analyze the linear trend present in the data set, as given by the regression function. Students investigate how moving the points of the data set affects the slope of the regression line, and they analyze the effect of outliers on the regression function. Students also explore Anscombe's Quartet--a group of 4 data sets which are used to show that data sets which have strikingly different graphical shapes can be described by the same linear regression function.	S.ID.6a S.ID.6c S.ID.7	✓		•								•	

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Least Squares Regression (continued)	Using Linear Regression	Students are given a table of data and a linear regression equation that represents the line of best fit. They calculate values of the dependent variable using the linear regression equation. Students compare the values of the dependent variable from both representations, stating whether the question called for interpolation or extrapolation, and whether the linear regression answer was reasonable or not based upon the table of data. The worked example and practice problems are provided in a context.	S.ID.6a	✓							•			•	•
Correlation	Interpreting Lines of Best Fit	Students are introduced to the terms correlation coefficient, positive association, and negative association through examples of scatter plots. They select the possible correlation coefficients for given scatter plots from a range of choices using their conceptual understanding. They complete problems in context, giving rough estimates of the value of r, stating how the estimate is reflected in the table of values, and determining whether the linear regression equation is appropriate for the data set.	S.ID.7 S.ID.8	✓											•
	Correlation and Causation	In different scenarios, students use necessary and sufficient conditions to distinguish between quantities that are correlated and not correlated, and between those that are only correlated versus those that are both correlated and causally related.	S.ID.9	✓										•	

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Creating Residual Plots	Analyzing Residuals of Lines of Best Fit	Students view an animation demonstrating the least squares regression method. Given a scatter plot and possible lines of best fit, they must complete the least squares regression method for each line to determine which is the line of best fit. The term residual is defined and a formula provided. Students analyze a scatter plot and line of best fit, a table comparing the data with the residuals, and a residual plot. They practice making residual tables and analyzing residual plots to decide whether a line of best fit is a good fit.	S.ID.6b	✔			•				•				•

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2 Exploring Constant Change

Topic 1 Linear Functions

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Strategies: Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Connecting Arithmetic Sequences and Linear Functions	Writing Sequences as Linear Functions	Students classify sequences as arithmetic, geometric, or neither based on their graphs. Students then determine the function family for the sequence, write an explicit formula for the sequence, and finally rewrite it in linear form.	F.IF.1 F.IF.6		✓										
	Understanding Linear Functions	Students use an interactive Explore tool to investigate linear functions in the context of a plane's ascent and descent. Students analyze the different functions' x-intercepts, y-intercepts, domains, ranges, and slopes. Students then solve problems in context by using the Explore tool and solving for the slope (rate of change of descent/ascent) and the initial height (y-intercept).	F.IF.1 F.IF.6	✓		•			•					•	
	Equal Differences Over Equal Intervals	Students watch an animation showing how steps and straight lines described by linear functions are connected. Students demonstrate that straight lines increase or decrease equal amounts over equal intervals, and they show that the average rate of change between any two points on a straight line is the same. Finally, students connect linear functions with arithmetic sequences and show that arithmetic sequences change equal amounts over equal intervals. Students learn that the common difference of an arithmetic sequence is the same as the slope of the line that is matched to the sequence.	F.LE.1a	✓			•				•				
Multiple Representations of Linear Functions	Multiple Representations of Linear Functions	Students represent scenarios with linear expressions. They compare multiple representations of linear functions and determine whether a table, graph, or equation match a given scenario. Students match graphed lines and equations to given scenarios.	N.Q.2	✓				•						•	

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Multiple Representations of Linear Functions (continued)	Modeling Linear Relationships Using Multiple Representations	Students model problems using expressions, tables, and graphs. Students use number properties to evaluate and solve one-step and two-step equations.	A.CED.1		✓				•		•		•	•	
Transforming Linear Functions	Exploring Graphs of Linear Functions	Students use an interactive function machine and a graph to identify transformations of functions, including vertical translations and vertical dilations, and analyze function equations and graphs. Students identify intercepts of the graphs.	A.REI.10 F.IF.1 F.BF.3	✓		•									
	Vertically Translating Linear Functions	Students vertically shift graphs of linear functions. They use verbal descriptions, graphs, and algebraic representations.	F.BF.3		✓										
	Vertically Dilating Linear Functions	Students vertically dilate graphs of linear functions. They use verbal descriptions, graphs, and algebraic representations.	F.BF.3		✓										
	Multiple Transformations of Linear Functions	Given a representation of a transformed function, students determine how the basic linear function was transformed to create the new function.	F.BF.3		✓										
Slopes of Parallel and Perpendicular Lines	Introduction to Parallel and Perpendicular Lines	Students answer questions related to an animation demonstrating that the rotation of a point (x, y) 90° counterclockwise on the coordinate plane is given by the coordinates (-y, x). Students answer questions to discover that the slopes of perpendicular lines are negative reciprocals of each other. Students then use graphs of functions to understand that the slopes of parallel lines are equal. Finally, students use their knowledge of parallel and perpendicular lines as graphs of functions to solve problems in a real-world context.	G.-GPE.2.5	✓		•							•		
	Modeling Parallel and Perpendicular Lines	Students determine the equations of lines parallel or perpendicular to given lines.	G.-GPE.2.5		✓				•		•			•	

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Comparing Linear Functions in Different Forms	Comparing Linear Functions in Different Forms	Given two linear functions in different representations -- equation, graph, table, or description -- with a contextual or noncontextual scenario, students compare the functions' slopes or y-intercepts.	F.IF.C.9		✓									•	

Topic 2 Solving Linear Equations and Inequalities

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Solving Linear and Literal Equations	Reasoning About Solving Equations	Students review the four Properties of Equality and then use these properties to justify steps in solving linear equations with integer and rational coefficients and variables on both sides. Students are then shown one way to solve equations, and they use given Properties of Equality to complete steps in solving the equations in a different way.	A.REI.1	✓							•				•
	Solving Linear Equations in a Variety of Forms	Solve linear equations in all forms.	A.REI.1 A.REI.3		✓								•		
	Extending Equations to Literal Equations	Students use their knowledge of solving multi-step linear equations to solve a literal equation of the same form.	A.CED.4		✓								•		
	Solving Literal Equations	Students solved literal equations with the aid of a parallel linear equation. In this workspace, the scaffolding is removed and students are responsible for solving a single literal equation.	A.CED.4		✓								•		
Modeling Linear Inequalities	Graphing Inequalities with Rational Numbers	Students graph simple inequalities involving rational numbers on a number line.	A.REI.3		✓				•						
	Solving Two-Step Linear Inequalities	Students solve linear inequalities.	A.REI.3		✓				•				•		

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Modeling Linear Inequalities (continued)	Representing Compound Inequalities	Students make a distinction between two types of compound inequalities, conjunctions and disjunctions. They interpret the meaning of compound inequality statements written in inequality notation. Students write compound inequalities to represent problems in context. Students interpret graphs by selecting the compound inequality that represents a given graph.	A.REI.3	✓				•							•

Topic 3 Systems of Equations and Inequalities

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Introduction to Systems of Linear Equations	Representing Systems of Linear Functions	Students reason with linear functions and their graphs to solve systems of two linear functions in real-world contexts. Students use graphs, situations, and equations to solve for both the independent and dependent variables in problems.	A.REI.C.6 A.REI.11	✓							•			•	
	Modeling Linear Systems Using Integers		A.REI.6		✓				•		•		•	•	
	Solving Linear Systems Using Substitution		A.REI.6		✓				•					•	
Using Linear Combinations to Solve a System of Linear Equations	Solving Linear Systems Using Linear Combinations	Students solve systems of linear equations using linear combinations and compare the algebraic and graphical solutions.	A.REI.C.5		✓				•				•		
	Solving Linear Systems Using Any Method	Students choose to solve systems of linear equations using substitution or linear combinations.	A.REI.C.6		✓										
Graphing Linear Inequalities in Two Variables	Exploring Linear Inequalities	Students model solution sets of inequalities in two variables as half-planes on the coordinate plane. They are introduced to cases where a point is included and excluded from the solution set of an inequality. Students connect graphical solutions with algebraic solutions.	A.REI.12	✓									•		
	Graphing Linear Inequalities in Two Variables	Students graph and solve linear inequalities in two variables graphically by determining the correct half-planes for the solution sets.	A.REI.12		✓										

2 Exploring Constant Change

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Graphing a System of Linear Inequalities	Systems of Linear Inequalities	Students determine the intersections between two inequalities, graph the inequalities, and shade the regions representing the solutions and their intersections.	A.REI.12		✓				•						
	Interpreting Solutions to Systems of Inequalities	Students will learn how to interpret solutions to systems of inequalities.	A.CED.3	✓					•					•	

Topic 4 Shapes on a Coordinate Plane

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Distances on the Coordinate Plane	Deriving the Distance Formula	Students answer questions related to an animation demonstrating how the Distance Formula is derived using the Pythagorean Theorem. Students then use interactive Explore Tools and the Distance Formula to solve mathematical problems about the distances between two points on the coordinate plane.	G.GPE.7	✓		•		•							
	Calculating Distances using the Distance Formula	Students use the distance formula to determine distances between points.	G.GPE.7		✓			•					•		
	Calculating Perimeter and Area Using the Distance Formula	Students use the distance formula to determine perimeters and areas of different shapes.	G.GPE.7		✓					•			•		

3 Investigating Growth and Decay

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Strategies: Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Topic 1 Introduction to Exponential Functions															
Geometric Sequences and Exponential Functions	Writing Sequences as Exponential Functions	Students classify sequences as arithmetic, geometric, or neither based on their graphs. Students then determine the function family for the sequence, write an explicit formula for the sequence, and finally rewrite it in exponential form	F.IF.3		✓										
Comparing Exponential Functions	Solving Contextual Exponential Relations Using Common Bases	Students model contextual scenarios by creating equations or inequalities involving an exponential expression with a single variable and a constant expression. Student solve for the variable by rewriting the expressions as exponential expressions with a common base, rewriting the equation or inequality with just the exponents, and then simplifying if necessary to isolate the variable. Finally, students interpret their symbolic solution in terms of the contexts.	A.CED.1		✓								•		
	Comparing Exponential Functions in Different Forms	Given two exponential functions in different representations -- equation, graph, table, or description -- with a contextual or noncontextual scenario, students compare the functions' y-intercepts, x-intercepts, or average rates of change over a specific interval.	F.IF.C.9		✓									•	
Transformations of Exponential Functions	Introduction to Transforming Exponential Functions	Students use four animations, demonstrating the different ways of transforming an exponential function, to investigate how changing the equation for an exponential function changes the graph of the function. Students answer questions related to horizontal and vertical translations and dilations of exponential functions.	F.BF.3	✓			•								
	Vertically Translating Exponential Functions	Students vertically shift graphs of linear and exponential functions. Students use verbal descriptions, graphs, and algebraic representations.	F.BF.3		✓				•						

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3 Investigating Growth and Decay

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Transformations of Exponential Functions (continued)	Horizontally Translating Exponential Functions	Students horizontally shift graphs of linear and exponential functions. Students use verbal descriptions, graphs, and algebraic representations.	F.BF.3		✓				•						
	Reflecting and Dilating Exponential Functions Using Graphs	Students reflect and dilate graphs of linear and exponential functions. Students use verbal descriptions, graphs, and algebraic representations.	F.BF.3		✓				•						
	Transforming Exponential Functions Using Tables of Values	Given a table of values and a table of transformed values, students determine how the basic linear and exponential functions were transformed to create the new functions.	F.BF.3		✓				•						
	Multiple Transformations of Exponential Functions	Given a representation of a transformed function, students determine how the basic linear and exponential functions were transformed to create the new functions.	F.BF.3		✓				•						

Topic 2 Using Exponential Equations

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Exponential Equations for Growth and Decay	Recognizing Linear and Exponential Models	Students compare linear and exponential functions and their graphs in the context of simple interest (linear) and compound interest (exponential). Students solve problems related to the independent and dependent variables of both linear and exponential functions using the graphs and equations.	F.LE.1b F.LE.1c	✓					•					•	•
	Calculating and Interpreting Average Rate of Change	A formula is provided to calculate the average rate of change for a specified interval of an exponential function, and the reason it is considered an average is explained. Students are provided contexts along with either a graph or table. They must calculate the average rate of change for specified intervals of the function, and make an estimation for another interval based upon their results.	F.IF.6	✓							•				•

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3 Investigating Growth and Decay

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Exponential Equations for Growth and Decay (continued)	Recognizing Growth and Decay	Students watch two different animations: one shows a model of exponential growth and one shows a model of exponential decay. They analyze how to recognize the difference between the two exponential models before interpreting exponential functions using scenarios of population increase and decrease.	F.LE.1c	✓			•							•	
Solving Exponential Equations	Modeling Equations with a Starting Point of 1.	Students use exponential equations with a y-intercept of 1 to model scenarios. They answer questions by completing a table of values and graphing corresponding points of the exponential function.	A.CED.2 A.REI.10		✓				•		•			•	
	Modeling Equations with a Starting Point Other Than 1	Students use exponential equations with a y-intercept other than 1 to model scenarios. They answer questions by completing a table of values and graphing corresponding points of the exponential function.	A.CED.2 A.REI.10		✓				•		•			•	
	Solving Exponential Equations Using a Graph	Students write the equation for an exponential function (with a dilation, vertical shift, or horizontal shift) from a contextual scenario. Students then use a graph to determine the solution to the equation for a given dependent value, and interpret the solution in context.	A.REI.11		✓				•					•	
Modeling Using Exponential Functions	Relating the Domain to Exponential Functions	Students determine the domain of exponential functions. Scenarios are provided, and in light of the context, two factors must be considered: the lowest and highest values for the independent variable and the types of numbers that make sense for the independent variable. Several examples are provided to model the process of selecting an appropriate domain prior to students completing problems independently.	F.IF.5	✓							•				•

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3 Investigating Growth and Decay

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Modeling Using Exponential Functions (continued)	Exploring Exponential Regressions	Students use an interactive Explore Tool to investigate exponential regression functions. They enter data related to various real-world contexts and use the Explore Tool to determine the exponential regression equation. Students interpret the parameters of the regression equation in the context of the data and investigate how moving the points of the data set affects those parameters. They use a regression equation to make predictions based on interpolation and extrapolation, determining which prediction is more accurate and why.	S.ID.6a	✓		•								•	

4 Describing Distributions

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Strategies: Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Topic 1 One-Variable Statistics															
Graphically Representing Data	Creating Frequency Plots	Given a data set in context, students construct either a dot plot or histogram. In both cases, they must select a title based on the description of the data. For dot plots, students must identify the least and greatest data values, then the bounds on the number line are provided. Students then use a tool to plot each data value to create the dot plot. For histograms, students must label the axes and create a scale for the horizontal axis, while the scale for the vertical axis is provided. They then use a tool to graph each bin; as students select the data that belongs in each bin, the tool graphs each bin to the appropriate height. Data values include rational numbers.	S.ID.1		✓				•					•	
	Describing Data Sets	Students watch an animation to review shape, center, and spread of a data set. They describe a data set by its shape, reviewing skewness and the terms cluster, gap, peak, and outlier. Students review mean and median and describe a data set using each center. They review range and interquartile range before being introduced to standard deviation and use these measures of spread to describe a data set.	S.ID.3	✓			•							•	•
Comparing Measures of Center and Spread	Determining Appropriate Measures of Center	Students use their understanding of mean, median, and mode to determine which was used as the measure of central tendency.	S.ID.2		✓										
	Measuring the Effects of Changing Data Sets	Students calculate mean and median, with and without an additional data value, and compare the original and adjusted measures.	S.ID.3		✓										

4 Describing Distributions

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Comparing Measures of Center and Spread (continued)	Creating Box Plots and Identifying Outliers	Given a scenario and a corresponding data set, students determine the five-number summary. They also calculate the IQR, lower fence, and upper fence in order to identify any outliers. As students place their responses in a framework which visually supports the order of the values on a number line, a box plot is constructed for them using their responses. They then select an appropriate title for their box plot. Additionally, a tool is provided to help students determine the median, Q1, and Q3 in an efficient manner.	S.ID.1		✓	•			•					•	
	Calculating Standard Deviation	Students compute the mean, variance, and standard deviation of data sets.	S.ID.2		✓						•			•	
Comparing Data Sets	Comparing and Interpreting Measures of Center	Students calculate the mean and median of a data set and determine which is the better measure of center based on the distribution of the data. They also examine when a mean or median cannot be determined from a given display as well as the effect that outliers have on the mean. Finally, students compare two data sets according to each set's better measure of center.	S.ID.2 S.ID.3	✓							•				•
	Comparing Data Sets Using Center and Spread		S.ID.2 S.ID.3		✓										

Topic 2 Two-Variable Categorical Data

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Two-Variable Categorical Data	Creating Marginal Frequency Distributions	Students construct a Marginal Frequency Distribution from an input Data Table for a contextual scenario.	S.ID.5		✓						•			•	
	Using Marginal Frequency Distributions	Students analyze a Marginal Frequency Distribution to answer questions about frequencies for interior and total cells, categories with minimum or maximum frequencies for interior and/or total cells, and comparing frequencies in different rows or columns	S.ID.5		✓										

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Two-Variable Categorical Data (continued)	Creating Marginal Relative Frequency Distributions	Students construct a Marginal Relative Frequency Distribution from an input Marginal Frequency Distribution for a contextual scenario.	S.ID.5		✔						•			•	
	Using Marginal Relative Frequency Distributions	Students analyze a Marginal Relative Frequency Distribution to answer questions about relative frequencies for interior and total cells, categories with minimum or maximum relative frequencies for interior and/or total cells, and comparing relative frequencies in different rows or columns.	S.ID.5		✔										
	Creating Conditional Relative Frequency Distributions	Students construct a Conditional Relative Frequency Distribution from an input Marginal Frequency Distribution for a contextual scenario.	S.ID.5		✔						•			•	
	Using Conditional Relative Frequency Distributions	Students analyze a Conditional Relative Frequency Distribution to answer questions about conditional frequencies for interior cells, categories with minimum or maximum conditional frequencies for interior cells, comparing conditional frequencies in different rows or columns, and whether there appears to be an association between the categorical variables.	S.ID.5		✔										

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5 Analyzing Geometric Functions

Topic 1 Constructions

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
From Informal to Formal Geometric Thinking	Introduction to Geometric Figures	Students watch an animation defining some of these basic geometric figures: point, line, line segment, ray, and angle. They identify these figures highlighted in a diagram. Students learn the symbols used to name these geometric figures. They analyze when these figures have more than one name.	G.CO.1	✓											
	Naming Lines, Rays, Segments, and Angles	Students practice identifying geometric entities from their names, writing names for various geometric entities, and identifying when an entity has multiple possible names.	G.CO.1		✓					•					
	Working with Measures of Segments and Angles	Students practice writing measure statements for segments and angles using appropriate notation.	G.CO.1		✓					•					

Topic 2 Rigid Motions on a Plane

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Geometric Components of Rigid Motions	Developing Definitions of Rigid Motions	Students learn the formal definitions for translation, reflection, and rotation as rigid motions. Students then apply these formal definitions to other situations involving mathematical transformations.	G.CO.4	✓						•					
	Exploring Rigid Motions and Dilations	Students use an interactive Explore Tool to perform translations, reflections, rotations, and dilations. Students also identify vertical and horizontal symmetry and observe and predict changes in the scale factors of dilations when they represent reductions, enlargements, or congruences. Students then describe sequences of geometric transformations that map one figure onto a congruent or similar figure.	G.CO.5	✓				•							

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5 Analyzing Geometric Functions

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						Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Reflectional and Rotational Symmetry	Rotations and Reflections on the Plane	Students apply the formal definitions of reflection and rotation to identify rigid motions that carry rectangles, non-rectangular parallelograms, trapezoids, and regular polygons onto themselves. Students learn that figures which can be reflected or rotated onto themselves have reflectional or rotational symmetry.	G.CO.3	✓			•			•					
	Reflectional Symmetry	The student uses a diagram tool to draw the reflectional symmetries, if any, for a variety of polygons. For each reflectional symmetry, the student writes a reflection function.	G.CO.3		✓					•					
	Rotational Symmetry	The student uses a diagram tool to draw the rotational symmetries, if any, for a variety of polygons. For each rotational symmetry, the student writes a rotation function.	G.CO.3		✓					•					

Topic 3 Congruence Through Transformations

MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery	Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example
Formal Reasoning in Euclidean Geometry	Calculating and Justifying Angle Measures	Students calculate the measure of the sought angle by following a prescribed path of angle measures.	G.CO.9		✓					•					
	Calculating Angle Measures	Students calculate the measure of the sought angle by following an open solution path.	G.CO.9		✓					•					
Triangle Congruence Theorems	Introduction to Triangle Congruence	Students practice writing and identifying triangle congruency statements, as well as corresponding sides and angles, given a diagram of congruent triangles or a triangle congruency statement. They then watch a video that introduces the four theorems of triangle congruence--SAS, SSS, AAS, and ASA. Finally, students use a sorting tool to match images of pairs of triangles with congruency markings to the theorem by which they are proven congruent.	G.CO.7 G.CO.8	✓		•	•								•