

<div style="background-color: black; color: white; padding: 10px; font-size: 2em; font-weight: bold; display: inline-block;">1</div> <div style="background-color: #00AEEF; color: white; padding: 10px; font-size: 2em; font-weight: bold; display: inline-block;">Thinking Proportionally</div>						Strategies													
						Animations	Classifications	Explore Tools	Graphing Tools	Interactive Diagrams	Interactive Worksheets	Proof	Real-World Scenarios	Solvers	Worked Example				
MATHia Unit	MATHia Workspace	Overview	CCSS	Concept Builder	Mastery														

Circles and Ratio																			
Exploring the Ratio of Circle Circumference to Diameter	Investigating Circles	Students identify parts of a circle, analyze the ratio of circumference to diameter of various circles, and then define pi.	7.G.B.4	✓															•
	Solving Area and Circumference Problems	Developing the Area Formula for Circles	Students informally derive the area of a circle by investigating the relationship between circumference and area. They calculate the area of a circle given different measurements for a radius or diameter.	7.G.B.4	✓														
Calculating Circumference and Area of Circles		Students determine the circumference and area of circles using diagrams and real-world objects. Students work strategically to identify measurements and use the formula for circumference and area to solve problems.	7.G.B.4		✓														•

Fractional Rates																			
Ratio Representations	Recognizing Proportional Relationships	Students review proportional relationships by recognizing proportions in ratios, tables, and graphs.	7.RP.2a	✓															•
	Determining Characteristics of Graphs of Proportional Relationships	Given graphs, students determine if the graph represents a direct variation equation.	7.RP.2a	✓															•
Ratios of Fractions	Fractional Rates	Students write fractional unit rates for ratios given as integer quantities. They use models to compute unit rates for ratios with fractions. Students use proportions to compute unit rates for ratios written as complex fractions.	7.RP.1	✓															
	Determining and Comparing Unit Rates	Students develop fluency in determining and comparing unit rates.	7.RP.1		✓														
	Solving Proportions Using Equivalent Ratios	Students calculate unknown values in a given scenario using equivalent ratios.	7.RP.2c		✓														

1 Thinking Proportionally		Strategies												
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Using Means and Extremes to Solve Proportions	Rewriting Proportions as Products	Students notice patterns in proportions written in the form $a : b = c : d$. They rewrite proportions as the product of the means equal to the product of the extremes. Students isolate the variable in proportions with an unknown quantity. They solve problems using proportions and the means and extremes method.	7.RP.2c	✓										
	Solving Proportions Using Means and Extremes	Students calculate unknown values in a given scenario using the means and extremes method.	7.RP.2c		✓									

Proportionality														
Defining Proportional Relationships	Exploring Proportions	Given a scenario, students define the varying quantities, write proportions, and determine the common ratio between the two variables. They then use the proportions to write direct variation equations and solve problems.	7.RP.2a 7.RP.2b	✓										
Determining the Constant of Proportionality	Writing Proportional Relationships with Equations	Given a table, students determine a constant of proportionality, write an associated proportion, graph the points from the table, and write a direct variation equation for the table.	7.RP.2b 7.RP.2c		✓							•		
	Converting Between Forms of Proportional Relationships	Given a scenario, students define variables, determine a constant of proportionality, write a proportion, and write a specified direct variation equation.	7.RP.2b 7.RP.2c		✓									
Constant of Proportionality in Multiple Representations	Modeling the Constant of Proportionality	Given a scenario, students complete a table of values, write a direct variation equation, plot values from the table, and draw the line representing the direct variation equation.	7.RP.2.b 7.RP.2.d		✓							•	•	

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Proportional Relationships																			
Analyzing Percent Models	Fractional Percent Models	Students extend their understanding of percent models to models that include fractional percents and percents less than 1. Students watch an animation and answer questions to deepen their understanding of conversions.	7.RP.3	✓															
	Converting with Fractional Percents	Students practice converting between fractions, decimals, and percents.	7.RP.3	✓															
Introducing Proportions to Solve Percent Problems	Using Proportions to Solve Percent Problems	Students examine partial worked examples to solve for the part, percent, or whole in percent problems using equivalent fractions and proportions.	7.RP.3	✓															
	Solving Simple Percent Problems	Students practice problems in which they solve for the part, the percent, or whole in percent problems using proportions.	7.RP.3	✓															
Calculating Sales Tax and Discounts	Calculating Sales Tax or Discounts	Students solve personal finance problems involving either sales tax or discounts.	7.RP.3																
	Solving Problems with Both Sales Tax and Discounts	Students solve personal finance problems involving both sales tax and discounts.	7.RP.3																
	Analyzing Different Forms of Expressions	Students follow worked examples that show that expressions can be rewritten to describe sales tax and discount situations in many ways. Students rewrite expressions describing situations and interpret the rewritten expressions to highlight the different ways the expressions reveal different aspects of the situations.	7.EE.2 7.RP.3	✓															
Percent Increase and Percent Decrease	Calculating Percent Change and Final Amounts	Students determine the percent increase or decrease or the final amount in a percent change problem using equivalent ratios or means and extremes.	7.RP.3																
	Using Percents and Percent Change	Students will use proportions to solve a variety of percent equations from given scenarios.	7.RP.3																

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Scale and Scale Drawings	Critical Attributes of Similar Figures	Students watch an animation which uses an eclipse as a context to explain similarity. Students learn that the corresponding angles of similar figures are congruent and the corresponding side lengths are proportional. They use these attributes--corresponding angles and proportional side lengths--to identify similar figures and to show that congruent figures are also similar.	7.G.1	✓		•									
	Using Scale Drawings	Students are introduced to scale and similar figures. They analyze models to determine whether they are scaled drawings of larger objects. Students use proportions to determine lengths and areas of scaled figures.	7.G.1	✓		•			•						
	Calculating Measurements Using a Scale	Students use scale factors to determine unknown measures in real-life scenarios.	7.G.1		✓										

2		Operating with Signed Numbers				Strategies											
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Adding and Subtracting Rational Numbers																	
Using Models to Understand Integers	Understanding Opposites	Students watch an animation that introduces opposite values and describes how opposite values on a number line have the same absolute value. The animation explains why direction and the meaning of 0 are important when thinking about opposite quantities in situations. Students determine the opposites of numbers, show that the sum of a number and its opposite is 0, and use what they know about opposites to add positive and negative numbers in context.	7.NS.1a 7.NS.1b	✓													
Adding and Subtracting Integers	Adding and Subtracting Negative Integers	Students use an interactive number line to add and subtract negative numbers.	7.NS.1b 7.NS.1c	✓													
	Using Number Lines to Add and Subtract Integers	Students practice adding and subtracting on number lines using a similar model to the one they used on the interactive number line.	7.NS.1		✓												
	Developing Algorithms for Adding or Subtracting Integers	Students connect number line models of sums of integers with the same sign to an algorithm for adding integers with the same sign. They do the same for the sums of integers with different signs. Students then notice that the models for subtracting integers are the same as the models for adding the opposite of the number. They rewrite subtraction expressions as addition expressions and use the rules for adding integers to determine the sum.	7.NS.1.b 7.NS.1.c	✓													

Multiplying and Dividing Rational Numbers																	
Multiplying and Dividing Integers	Integer Products and Quotients	Students use models to determine integer products. They analyze fact families to determine integer quotients.	7.NS.2b	✓													

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Multiplying and Dividing Integers (continued)	Problem Solving with Rational Numbers	Students solve contextual problems involving rational numbers and the four operators. They use models representing the relationship between the quantities in the scenario to determine an algebraic expression that can be used to solve the problem. Students interpret the value of the expression in the context of the problem.	7.NS.3		✓											
	Operating with Signed Decimals	Students evaluate expressions with two signed decimals using the standard algorithm. They identify the expected sign of the result by reasoning about the signs of the decimals in the expression. Students then evaluate a modified expression before entering the final result with the correct sign.	7.NS.1d 7.NS.2c		✓											
	Operating with Signed Fractions	Students evaluate expressions with two signed fractions using the standard algorithm. They identify the expected sign of the result by reasoning about the signs of the fractions in the expression. Students then evaluate a modified expression before entering the final result with the correct sign.	7.NS.1d 7.NS.2c		✓											
Quotients of Integers	Converting Rational Numbers to Decimals	Students divide fractions to determine if the resulting equivalent decimal is terminating or repeating.	7.NS.2d		✓					•						
Rewriting Numeric Expressions	Operating with Numeric Expressions	Students recall the Order of Operations and use the Order of Operations to add, subtract, multiply, and divide with rational numbers and powers. They determine the terms in a numeric expression and combine like terms.	7.NS.3	✓		•										
	Evaluating Simple Numeric Expressions with Integers	Students practice evaluating two-step numeric expressions that contain integer values.	7.NS.3		✓											
	Evaluating Numeric Expressions Involving Integers with Parentheses and Exponents	Students practice evaluating numeric expressions that contain integer values, parentheses, and exponents.	7.NS.3		✓											
	Evaluating Simple Numeric Expressions with Rational Numbers	Students practice evaluating a variety of simple numeric expressions that contain integer values.	7.NS.3		✓											

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Rewriting Numeric Expressions (continued)	Evaluating Complex Numeric Expressions with Rational Numbers	Students practice evaluating a variety of complex numeric expressions that contain integer values.	7.NS.3		✓											

3 Reasoning Algebraically		Strategies													
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Algebraic Expressions															
Combining Like Terms	Rewriting Variable Expressions Using the Distributive Property	Factoring Linear Expressions	Students model the product of two factors and explore different factors of expressions through the use of an interactive tool. They use the Distributive Property in reverse to factor expressions.	7.EE.1	✓										
	Rewriting Simple Algebraic Expressions Involving Integer Coefficients	Rewriting Algebraic Expressions Involving Integer Coefficients with Four Operations	Students rewrite algebraic expressions that contain integer coefficients by combining like terms, using number properties, and applying the Order of Operations.	7.EE.1	✓										
	Rewriting Algebraic Expressions Involving Integer Coefficients with Parentheses and Exponents	Rewriting Complex Algebraic Expressions Involving Integer Coefficients	Students rewrite algebraic expressions that contain integer coefficients, parentheses, and exponents by combining like terms, using number properties, and applying the Order of Operations.	7.EE.1	✓										
	Rewriting Algebraic Expressions Involving Integer Coefficients	Rewriting Algebraic Expressions Involving Integer Coefficients	Students rewrite complex algebraic expressions that contain integer coefficients by combining like terms, using number properties, and applying the Order of Operations.	7.EE.1	✓										
	Rewriting Algebraic Expressions Involving Integer Coefficients		Students rewrite a variety of algebraic expressions that contain integer coefficients by combining like terms, using number properties, and applying the Order of Operations.	7.EE.1	✓										

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Two-Step Equations and Inequalities																					
Modeling Equations by Equal Expressions	Using Picture Algebra with Equations	Students will create visual models for given scenarios, write two-step expressions and equations, and then use mental math to solve for unknown values.	7.EE.4		✓																
	Identifying Attributes of Linear Relationships	Students identify attributes of linear relationships from a scenario and from a graph by determining whether the starting value is positive or negative and whether the rate of change is positive or negative. They interpret the model of a two-step linear equation.	7.EE.4	✓																	
	Analyzing Models of Two-Step Linear Relationships	Students analyze scenarios of two-step linear relationships. They are given an equation that models the scenario. Students then match the different expressions in the equation to verbal descriptions of these quantities in the context of the scenario.	7.EE.4		✓																
	Modeling Two-Step Expressions	From given scenarios, students determine unknown values and enter values into tables to recognize patterns. Students express these patterns in two-step expressions.	7.EE.4		✓																
	Checking Solutions to Linear Equations	Students substitute given values into two-step equations to determine the values are solutions to the equations.	7.EE.4a		✓																
Using Inverse Operations to Solve Equations	Exploring Two-Step Equations	Students use a balance tool to explore two-step equations. They use a general strategy to solve any two-step equation.	7.EE.4a	✓																	
	Solving with Multiplication (No Type In)	Students solve two-step equations involving multiplication using the solver.	7.EE.4a		✓																
	Solving with Multiplication (Type In)	Students solve two-step equations involving multiplication.	7.EE.4a		✓																
	Solving with Division (No Type In)	Students solve two-step equations involving division using the solver.	7.EE.4a		✓																

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Using Inverse Operations to Solve Equations (continued)	Solving with Division (Type In)	Students solve two-step equations involving division using the solver.	7.EE.4a		✓										
	Solving Two-Step Equations	Students solve two-step equations involving all four operations.	7.EE.4a		✓										
Solving Inequalities with Inverse Operations	Graphing Inequalities with Rational Numbers	Students graph simple inequalities involving rational numbers on a number line.	7.EE.4b		✓							•			
	Solving One-Step Linear Inequalities	Students solve one-step inequalities algebraically. The inequalities include all four operations but are restricted to positive integers.	7.EE.4b		✓							•			
	Solving Two-Step Linear Inequalities	Students solve two-step linear inequalities.	7.EE.4b		✓							•			

Multiple Representations of Equations															
Representing Equations with Tables and Graphs	Graphs of Equations	Students model and analyze the graphs of linear equations. Students identify key characteristics of the graphs and use them to interpret problem situations.	7.EE.4a		✓										•
	Using Graphs to Solve Equations	Students watch an animation as they learn how to model the solution of a linear equation graphically. Students practice solving problems by modeling linear equations.	7.EE.4a		✓		•								
Building Inequalities and Equations to Solve Problems	Determining the Value of an Independent Variable	Students start with a scenario, a table, and a graph to determine the value of an independent variable given the value of the dependent variable.	7.EE.4a		✓										•
	Writing Linear Equations and Inequalities from a Scenario	Students translate between verbal phrases in scenarios to statements using mathematical symbols. They write inequalities to model scenarios.	7.EE.4		✓										
	Using Linear Equations and Inequalities	Students write equations and inequalities to represent problem situations. Students solve and interpret the solutions to the equations and inequalities in the context of the problem.	7.EE.3 7.EE.4			✓									

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Building Inequalities and Equations to Solve Problems (continued)	Solving Problems with Integers	Students write algebraic expressions involving integers to represent problem scenarios and to determine output values. Students solve equations to determine input values.	7.EE.3 7.EE.4a		✓									•
	Solving Problems with Decimals and Fractions	Students write algebraic expressions involving decimals and fractions to represent problem scenarios and to determine output values. Students solve equations to determine input values.	7.EE.3 7.EE.4a		✓									•

4 Analyzing Populations and Probabilities		Strategies													
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Introduction to Probability															
Introduction to Probability	Determining Probabilities	Students build probability models and determine probabilities of simple and disjoint events. They use proportions to make predictions based on samples and theoretical probabilities.	7.SP.C.5 7.SP.C.7a	✓											
	Modeling Simple Events	Students build a probability model and then use it to reason about the probability of a single event and its complement.	7.SP.7a		✓										
	Comparing Experimental and Theoretical Probabilities	Students examine data from probability experiments and compare with theoretical probabilities. They use results of probability experiments to make conjectures about theoretical probabilities.	7.SP.C.6 7.SP.C.7b	✓											
	Simulating Simple Events	Students use simulations to model real-world scenarios.	7.SP.8c	✓											

Compound Probability															
Compound Probability	Introduction to Compound Events	Students will extend what they know about simple events to compound events in the context of the game "Rock, Paper, Scissors."	7.SP.8a	✓											
	Calculating Compound Probabilities	Students use simulation, tree diagrams, organized lists, and tables to determine compound probabilities.	7.SP.C.8b	✓											
	Simulating Compound Events	Students will use random number tables to simulate compound events and make inferences about those events.	7.SP.8c	✓											

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Drawing Inferences															
Drawing Inferences	Using Statistics to Draw Inferences About a Population	In this workspace, students will learn how to discriminate between scenarios that belong to a sample versus a population, understand that random sampling tends to produce valid inferences, develop an informal understanding of bias, and see how conclusions about a population are valid only if the sample is representative of that population.	7.SP.1 7.SP.2	✓											
Comparing Two Populations	Comparing Characteristics of Data Displays	Students compare the characteristics of data displays, specifying which numerical characteristics can be determined from each display.	7.SP.3	✓											
	Comparing Populations using Data Displays	Students use data displays to compare populations by determining the visual overlap and describing the difference between the measures of centers in terms of measures of variability.	7.SP.3	✓											
	Using Random Samples to Compare Populations	Students use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.	7.SP.4	✓											

5		Constructing and Measuring				Strategies											
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Angles and Triangles																	
Special Angle Relationships	Calculating Angles	Students use an interactive circular protractor to measure angles and determine angle sums.	7.G.5	✓													
	Exploring Angle Relationships	Students use the definitions of complementary and supplementary angles to sort pairs of angles. They use the definition of adjacent angles, linear pairs, and vertical angles to determine whether given statements are true or false. Students use an explore tool to identify angle relationships created from two intersecting lines.	7.G.5	✓													
	Solving for Angle Measures	Students write and solve equations to solve for unknown angle measures.	7.G.5		✓												

Three-Dimensional Figures																	
Three-Dimensional Figures	Visualizing Cross Sections of Three-Dimensional Shapes	Students watch an animation showing two different intersections of a plane and a solid. They then describe cross-sections of different solids given the intersection of a plane. Finally, students identify the solid from a given cross-section.	7.G.3	✓													
Volume of Prisms and Pyramids	Calculating Volume of Right Prisms	Students determine the volume of right prisms.	7.G.6		✓												
	Understanding Volume Formulas for Right Prisms	Students relate the variables in the volume formula for a right prism to measurements shown in a diagram of a triangular prism. They map the parts of a triangular prism to the variables in the volume formula for a right prism. They then reason about how to determine an unknown measurement of a triangular prism given its volume.	7.G.6	✓													
	Using Volume of Right Prisms	Students use the volume of right prisms to solve for unknown values.	7.G.6		✓												

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Volume of Prisms and Pyramids (continued)	Relating Volumes of Prisms and Pyramids	Students watch an animation that shows that a pyramid with the same base and height as a corresponding prism has one-third the volume. They relate the formula for the volume of a prism and the volume of a pyramid. Students identify and calculate the volumes of different prisms and pyramids given different measurements. Students then work backwards from the volume to determine unknown measures of different prisms and pyramids.	7.G.6	✓		•									
	Calculating Volume of Pyramids	Students calculate the volume of pyramids in mathematical and real-world contexts using given measurements.	7.G.6		✓									•	
Surface Area of Pyramids and Prisms	Volume and Surface Area of Prisms and Pyramids	Students determine the volume and surface area of prisms and pyramids with bases that are not triangles or rectangles where the area of the base is given. They then calculate the area of regular polygons by dividing the area of the polygon into congruent triangles. Finally, students determine the volume and surface area of prisms and polygons with regular polygon bases by first calculating the area of its base.	7.G.6	✓										•	