National MSMS Course 2
2020-2021 MATHia Enhancements

CARNEGIE LEARNING

	Module	Textbook Topic	MATHia Unit	Workspace	Description	Enhancements
1	**Thinking Proportionally**	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.	CONTENT CHANGE: This workspace now only involves development of pi. NEW UNIT: The *Circles* unit was broken into the *Exploring the Ratio of Circle Circumference to Diameter* and *Solving Area and Circumference Problems* units.
			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.	NEW WORKSPACE: This workspace was spliced from the Investigating Circles workspace. The content of this workspace focuses on the development of the area formula for circles.
		Fractional Rates	Ratio Representations	Recognizing Proportional Relationships	Students review proportional relationships by recognizing proportions in ratios, tables, and graphs.	NEW WORKSPACE NAME: Formerly Proportional Relationships NEW UNITS: Two existing units, formerly entitled *Ratio and Rate Reasoning* and *Proportional Reasoning* were divided into three units *Ratio Representations*, *Ratios of Fractions*, and *Using Means and Extremes to Solve Proportions*. Content was rearranged between the three new units.

				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.	NEW UNIT NAME: Formerly entitled *Ratio and Rate Reasoning.* NEW LOCATION: This unit was originally the first unit in the workspace.
					Solving Proportions Using Equivalent Ratios	Students calculate unknown values in a given scenario using equivalent ratios.	NEW LOCATION: This workspace was formerly in the *Proportional Reasoning* unit.
				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.	NEW UNIT for 2020-2021.
			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.	NEW UNITS: The *Representing Proportional Relationships by Equations* unit was spliced into 3 units: *Defining Proportional Relationships, Determining the Constant of Proportionality,* and *Constant of Proportionality in Multiple Representations*. The content sequence did not change.

		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.	NEW UNIT NAME: Formerly *Percent Conversions*
			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.	NEW UNIT NAME: Formerly, *Proportional Reasoning and Percents*
			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.	NEW NAME: Formerly *Problem Solving with Percents Using Proportional Relationships* NEW LOCATION: Formerly followed the *Introducing Proportions to Solve Percents* unit.
			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.	NEW NAME: Formerly *Scale Drawings*
				Calculating Measurements	Students use scale factors to determine unknown measures in real-life scenarios.	NEW NAME, UPDATED CONTENT: Formerly *Using Scale Factor*, this

					Using a Scale		workspace now includes questions about computing areas.
2	**Operating with Signed Numbers**	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.	NEW UNITS: The *Integer Operations* unit was spliced into 4 units: *Using Models to Understand Integers*, *Adding and Subtracting Integers*, *Multiplying and Dividing Integers*, and *Quotients of Integers.*
		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.	NEW UNIT for 2020-2021 NEW WORKSPACE NAME: Formerly, *Multiplying and Dividing Integers*
				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.	NEW Mastery Workspace for 2020-2021

				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.	NEW Mastery Workspace for 2020-2021
				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.	NEW Mastery Workspace for 2020-2021
			Quotients of Integers	Converting Rational Numbers to Decimals	Students divide fractions to determine if the resulting equivalent decimal is terminating or repeating.	NEW UNIT for 2020-2021
			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.	NEW UNIT NAME: Formerly, *Evaluating Numeric Expressions* NEW Concept Builder for 2020-2021.

3	**Reasoning Algebraically**	Algebraic Expressions	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.	NEW UNITS: The *Variable Expressions* unit was spliced into the *Rewriting Variable Expressions Using the Distributive Property* and *Combining Like Terms* units.
		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.	NEW UNIT NAME: Formerly, *Modeling Two-Step Expressions and Equations*
				Checking Solutions to Linear Equations	Students substitute given values into two-step equations to determine the values are solutions to the equations.	NEW LOCATION: Previously in the unit now called *Using Inverse Operations to Solve Equations*
			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.	NEW UNIT NAME: Formerly, *Solving Two-Step Equations* NEW LOCATION: This workspace was previously in the Course 3 sequence.
			Solving Inequalities with Inverse Operations	Graphing Inequalities with Rational Numbers	Students graph simple inequalities involving rational numbers on a number line.	NEW UNIT NAME: Formerly, *Solving Two-Step Inequalities*
		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.	NEW UNIT LOCATION: Formerly after the unit called *Building Inequalities and Equations to Solve Problems* NEW UNIT NAME: Formerly entitled *The Coordinate Plane and Two-Step Equations*

			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.	NEW UNIT NAME: Formerly entitled *Problem Solving with Two-Step Equations and Inequalities*
				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.	NEW Concept Builder for 2020-2021.
4	**Analyzing Populations and Probabilities**	Introduction to Probability	Introduction to Probability	Modeling Simple Events	Students build a probability model and then use it to reason about the probability of a single event and its complement.	NEW Mastery Workspace for 2020-2021
		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.	SPLIT UNIT: The *Numerical Data Displays Comparisons* workspace was split into two units: *Drawing Inferences* and *Comparing Two Populations.*

			Comparing Two Populations	Comparing Characteristics of Data Displays	Students compare two data displays based in a context from among a dot plot, histogram, and boxplot. They determine whether they can identify several characteristics from the data displays and then provide either the response or reasoning why it is not possible. In addition, they sort all seven characteristics (the number of data values, mean, median, mode, range, IQR, and MAD) as to whether they can determine them from both data displays.	NEW Mastery Workspace for 2020-2021 (formerly a Concept Builder)
				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.	NEW Mastery Workspace for 2020-2021 (formerly a Concept Builder)
				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.	NEW Content Builder for 2020-2021
5	**Constructing and Measuring**	Angles and Triangles	Special Angle Relationships	Calculating Angles	Students use an interactive circular protractor to measure angles and determine angle sums.	NEW UNIT NAME: Formerly, *Angle Properties*

				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.	NEW NAME: Formerly *Classifying Angles and Determining Unknown Measures*. Solving equations for unknown angle measures were removed from this workspace because of the new Mastery Workspaces that were added for this year.
				Solving for Angle Measures	Students write and solve equations to solve for unknown angle measures.	NEW Mastery Workspace for 2020-2021
			Volume of Prisms and Pyramids	Calculating Volume of Right Prisms	Students determine the volume of right prisms.	NEW Mastery Workspace for 2020-2021
				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.	CONTENT CHANGE: Using Volume of Pyramids workspace was removed from this sequence.

| | | | | 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. | NEW Concept Builder for 2020-2021. |
| | | | 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. | NEW Concept Builder for 2020-2021. NEW UNIT for 2020-2021 |