

Development of Major Content Strands in Making Connections: Foundations for Algebra, Course 1

Chp	Working with Data	Number	Arithmetic Operations	Measurement	Ratio and Proportion
1	Students collect, organize, and display data as they get to know each other in the first lesson of the course. Students guess the length of 60 seconds and organize the class data into histograms and calculate measures of central tendency. They use measures of central tendency to evaluate in which experiment the class was more accurate.	Students represent and compare quantities using manipulatives, diagrams, and number expressions and make connections between the properties of a number and how it can be represented. Students also begin to work with directional movement on a number line, a preview to work with positive and negative integers that will come in Chapter 2.	Students represent multiplication using rectangular arrays and they examine the relationship between a number, its factors, and its factor pairs.	An explicit focus on measurement starts in Chapter 2.	Students investigate a proportional relationship as they predict the height of a tower of a million pennies.
2	This thread is spiraled through homework.	Students find multiple names for partial units of length, beginning a focus on equivalent fractions. Students compose and decompose integers as they create combinations of lengths to help an acrobat cross a tightrope. They model addition of positive and negative integers using movement to the right and to the left, as on a number line and with + and – pieces.	Students combine lengths with direction to help an acrobat across a fictional tightrope, adding integers. Students multiply integers, interpreting multiplication as repeated addition.	Students measure lengths using “broken” rulers, forcing them to make sense of length measurements as iterations of units of length. They also compare and convert units of length.	An explicit focus on ratio starts in Chapter 6.
3	This thread is spiraled through homework.	As students decompose and recompose multiple digit whole numbers to add, subtract, and multiply mentally, concepts of place value are reinforced. Students use linear models and + and – tiles to represent addition, subtraction, and multiplication of positive and negative quantities.	Students generate strategies for adding and multiplying multiple-digit whole numbers mentally. They learn the connection between multiplication and area. Students use + and – pieces to model subtraction of integers and they examine multiplication as repeated subtraction.	Students measure area using standard and nonstandard square units. The connection between multiplication and area is utilized to create area models for multiplying, laying the foundation for future work multiplying portions, mixed numbers, and algebraic expressions.	An explicit focus on ratio starts in Chapter 6.
4	Students organize data into scatter plots as they learn to set up axes to accommodate increasingly challenging data sets. Students collect data as they measure the length of their classroom using two different measuring tools. They use measures of central tendency and histograms to compare data sets and to determine which tool is more accurate.	Students study multiple representations of portions (percents, decimals, and fractions), as they make sense of the connections among representations and learn strategies for converting from each representation to each of the others.	This thread is spiraled throughout homework.	Students revisit their understanding of measuring length and consider issues of measurement accuracy as they measure the length of their classroom using two different measuring tools.	An explicit focus on ratio starts in Chapter 6.
5	Students revisit concepts of data analysis in the mid-course reflection.	Students compare fractions and identify and generate equivalent fractions as they compare probabilities. Students revisit their learning about number concepts in the mid-course reflection.	Students revisit operations with integers in the mid-course reflection.	Students are introduced to angles and their measures as they build and compare quadrilaterals. Students revisit their learning about measurement in the mid-course reflection.	An explicit focus on ratio starts in Chapter 6.

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6	This thread is spiraled through homework.	Students learn to use “The Giant One,” a technique based on the multiplicative identity property of one, to find and identify equivalent fractions. They develop number sense as they consider relative size of fractions.	Students capitalize on their firm understanding of area to multiply fractions, beginning by finding “parts of parts,” or portions of partial areas. Students also multiply mixed numbers, fractions greater than one, decimals, and percents and they estimate products of portions.	Students measure and compare lengths in original and enlarged figures, studying the relationships between similar figures. Students capitalize on their firm understanding of area to multiply fractions, beginning by finding “parts of parts,” or portions of partial areas.	Students are introduced to ratios as a way to compare lengths in enlarged and reduced figures. They then study ratios in other contexts. Students focus explicitly on equivalent fractions and ratios and find missing values in pairs of equivalent ratios, thus solving proportions informally.
7	This thread is spiraled through homework.	Students consider explicitly the connections between fractions and division, deepening their understanding of the meaning of a fraction.	Students divide lengths, resulting in combinations of partial units of length. They learn to add fractions, capitalizing on their understanding of equivalent fractions to help them rewrite as fractions with common denominators. Students consider the meaning of division and how it relates the fractional representation of a portion. Students add and subtract fractions, decimals, and mixed numbers.	Students learn to measure volume using cubic units and surface area using square units. They begin to generalize the measure of volume of right prisms, recognizing that cubic units can be counted by multiplying the area of the base of the prism by its height.	This thread is spiraled throughout homework.
8	This thread is spiraled through homework.	This thread is spiraled throughout homework.	Students learn to divide with fractions, mixed numbers, and decimals.	Students return to their understanding of angle measure, as they combine known and unknown angles. Students name supplementary, complimentary, and vertical angles. Students learn that the measures of the angles in a triangle add to 180° .	This thread is spiraled throughout homework.
9	Students take data, graph it, and analyze it, as they consider the relationship between distance and time for a toy moving at a constant rate. Students measure circumference and diameter of circles created by bubbles and use this data to discover the multiplier π .	Students revisit their understanding of percents, this time using composition and decomposition strategies to calculate percent discounts, interest, and tips.	Students calculate percent discounts, interests, and tips. Students find missing information in proportional relationships using several methods, including by solving proportional equations.	Students measure distance and time as they analyze the movement of a toy. They also measure circumference and diameter of circles, and use these measurements to discover π .	Students focus explicitly on proportional relationships, learning to identify them as multiplicative relationships and to recognize them in a graph. Students learn multiple strategies for solving proportions.
10	Students consider bias in survey questions and in sample selection. They analyze and interpret data collect in a class survey. Students also design their own surveys, select samples, conduct the surveys, and analyze results. As part of course closure, students display data to help predict most likely outcomes in a guessing game. They also use their learning about measures of central tendency to analyze trends in data.	Students continue to build number sense around portions as they calculate and compare probabilities. As part of course closure, students revisit their learning about multiple representations of portions.	Students multiply fractional probabilities to calculate probabilities of independent events. As part of course closure, students add and subtract fractional lengths and areas to decide on possible placements of furniture. They also add and divide positive and negative portions as they calculate measures of central tendency.	As part of course closure, students revisit their learning about length and area measurement, as they convert units and make calculations to decide on possible placements for furniture in a bedroom.	Students represent probabilities as ratios. They solve proportions to find expected outcomes. As part of course closure, students revisit their learning about ratios of enlargement or reduction and solve proportions to determine unknown lengths in scale drawings.

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Chp	Probability	Descriptive Geometry	Symbol Sense	Functions	Solving Equations	Multiple Representations
1	Students play a game of chance and begin to make observations about which outcomes are more likely than others.	An explicit focus on descriptive geometry starts in Chapter 5.	An explicit focus on working with variables starts in Chapter 2.	Students study geometric patterns, making observations about connections between figure numbers and number of dots or toothpicks in each figure.	Work with variables and informal equations will start in Chapter 2.	Students organize data into scatter plots in the first lesson of the course. Students examine a relationship in a table as they predict the height of a tower of a million pennies.
2	An explicit focus on probability starts in Chapter 5.	An explicit focus on descriptive geometry starts in Chapter 5.	Students extend their thinking about combining lengths on a tightrope to include unknown lengths, writing expressions. They also use given information to find unknown lengths, solving equations informally.		Students use given information about an acrobat's movements on a tightrope to find unknown lengths, solving equations informally.	Students are introduced to variable expressions as expressions of combinations of lengths, some of which are unknown. This lays the foundation for future work with algebraic rules.
3	An explicit focus on probability starts in Chapter 5.	An explicit focus on descriptive geometry starts in Chapter 5.	Explicit focus on working with variables will return in Chapter 8. This thread is spiraled through homework.		Students continue to solve equations informally in homework.	This thread is spiraled through homework.
4	An explicit focus on probability starts in Chapter 5.	An explicit focus on descriptive geometry starts in Chapter 5.	Explicit focus on working with variables will return in Chapter 8. This thread is spiraled through homework.	Students learn to graph in an xy -coordinate plane, laying the foundation for future work with graphing functions.	Students continue to solve equations informally in homework.	Students set up axes and make choices about scale in order to graph increasingly challenging data. They organize data in tables as well as graphs.
5	Students learn to express probabilities of single events as fractions and percents. They learn to distinguish theoretical from experimental probabilities and they strengthen their understanding of portions as they compare probabilities. Students revisit concepts of probability in the mid-course reflection.	Students build and compare quadrilaterals. They learn to describe the characteristics of quadrilaterals (lengths of sides and measures of angles) and they classify geometric figures. Students revisit their learning about descriptive geometry in the mid-course reflection.	Explicit focus on working with variables will return in Chapter 8. This thread is spiraled through homework.		Students continue to solve equations informally in homework.	Students revisit concepts of graphing in the mid-course reflection.

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6	This thread is spiraled throughout homework.	Students use their understanding of shapes to describe and compare enlarged and reduced shapes, determining similarity informally.	Explicit focus on working with variables will return in Chapter 8. This thread is spiraled through homework.		Students continue to solve equations informally in homework.	This thread is spiraled through homework.
7	This thread is spiraled throughout homework.	Students learn about properties of right rectangular prisms, as they investigate ideas of volume and surface area.	Explicit focus on working with variables will return in Chapter 8. This thread is spiraled through homework.		In a challenge culminating the focus on adding and subtracting portions, students determine the value of unknown symbols, using known quantities.	This thread is spiraled through homework.
8	This thread is spiraled throughout homework.	Students name supplementary, complimentary, and vertical angles. Students learn the triangle angle sum theorem.	Students write variable expressions to describe generic figures in geometric patterns. They use variables to represent and solve (informally) for unknown angle measures and other unknown quantities.	Students investigate the relationship between figure number and number of squares in a geometric figure. They use a variable for figure number to generalize, thus generating a functional rule.	Students use known quantities to solve for unknowns, continuing the focus on solving equations informally.	Students use a variable for figure number to write an expression for the number of tiles in a geometric figure, thus generating a rule. They make connections between rules and geometric figures. Students graph pairs of numbers that make rules work, making connections between graphs, rules, and tables.
9	This thread is spiraled throughout homework.	Students learn the relationship between circumference and diameter for circles. They identify prisms and cylinders.	Students find values of unknown quantities in proportional relationships.	Students make graphs of rules by finding pairs of numbers that make algebraic rules work.	Students use multiple methods to solve proportions.	Students graph proportional relationships, making connections between graphs, rules, and tables.
10	Students distinguish independent and dependent events and they calculate probabilities of independent events. They calculate theoretical probabilities for flipping three coins and then conduct the experiment, comparing theoretical with experimental probabilities for increasing numbers of trials. As part of course closure, students revisit ideas of experimental probability as they analyze data to determine most likely outcomes.	As part of course closure, students classify triangles, as they consider most likely outcomes in a guessing game.	As part of course closure, students determine unknown lengths given various information.	This thread is spiraled throughout homework.	As part of course closure, students determine unknown lengths given various information.	This thread is spiraled throughout homework.