Investigations in Number, Data, and Space®

Grade 4 Unit Summaries: 2nd Edition

Factors, Multiples, and Arrays: Multiplication and Division 1

In this first unit in the multiplication and division strand, students deepen their understanding of the operation of multiplication. Students use rectangular arrays to represent the relationship between factors and multiples, use what they know to solve problems that increase in size, and focus on solving problems efficiently. They continue to develop fluency with multiplication combinations (facts up to 12 x 12).

Describing the Shape of the Data: Data Analysis and Probability

This unit develops ideas about collecting, describing, and representing data. Students collect data through counting and measuring and use bar graphs and line plots to represent their data involving one group and compare data of two groups. They interpret the data and draw conclusions based on the data using terms such as mode, median, range, and outlier. Students begin their study of probability by placing events on a "likelihood line" that goes from impossible to certain and work with mixtures of colored cubes to describe the probability of different outcomes.

Multiple Towers and Division Stories: Multiplication and Division 2

Students develop strategies for solving multiplication problems with two-digit numbers and deepen their understanding of the operation of division by focusing on the relationship between multiplication and division. Using story contexts and multiple towers, students continue their investigation of the relationship between numbers and their factors. Students practice multiplying by 10 and multiples of 10, break problems into smaller parts that can be multiplied easily, and find the multiples of two-digit numbers. They gain fluency with all multiplication combinations to 12 x 12. Students solve, represent, and discuss division story problems, including some that have a remainder.

Size, Shape, and Symmetry: 2-D Geometry and Measurement

This first geometry and measurement unit focuses on classifying two-dimensional shapes, comparing the size of angles, and working with linear and area measurement. Students define and categorize polygons by identifying sets of shapes that have a common attribute and use 90 degrees as a reference for finding the measurement of other angles. They continue their measurement work from earlier grades by measuring distance and perimeter, using both U.S. and metric units and finding the area of polygons in square units.

LogoPaths, a *Logo* programming environment designed for *Investigations* students in Grades 3–5 is introduced in this unit. It allows students to explore geometrical relationships, especially focusing on angle, length, and perimeter, patterns in sides and angles, and characteristics of specific shapes.

Landmarks and Large Numbers: Addition, Subtraction, and the Number System

Students extend their knowledge of the number system by examining the structure of 10,000 and practice and refine strategies for adding and subtracting whole numbers up to 10,000. They continue to study place value by adding and subtracting multiples of 10 and 100 to numbers in the thousands, and they consolidate their understanding of the operation of addition by studying a variety of addition strategies and algorithms, including the U.S. algorithm for addition. Students continue their study of subtraction by solving, representing, and discussing their strategies for a variety of subtraction problems.

Fraction Cards and Decimal Squares: Rational Numbers

Students develop ideas about fractions by identifying fractions of an area (3/4 of a rectangle), fractions of a group of objects (3/4 of 24), and decimal fractions (.75). They compare fractions of different wholes (1/3 of a 6 x 4 rectangle and 1/3 of a 10 x 10 rectangle), and combine fractions using models and reasoning. Students use 10 x 10 grids to represent, compare, and combine common decimals in the tenths and hundredths.

Moving Between Solids and Silhouettes: 3-D Geometry and Measurement

In this second geometry and measurement unit, students examine the relationships between 3-D solids and their 2-D representations. They learn and use the mathematical terminology for these solids and their attributes. They translate between 3-D shapes and their 2-D representations as they build cube configurations from pictures and mental images and investigate silhouettes of solids from several different perspectives. Students build an understanding of measuring volume as they examine the structure of rectangular prisms and determine the number of cubes that fit inside given box patterns.

How Many Packages? How Many Groups?: Multiplication and Division 3

In this last multiplication and division unit in Grade 4, students continue to develop efficient strategies for solving multiplication problems by breaking problems into smaller parts or changing one or both numbers to create an easier problem. Students also focus on recording their work with clear and concise notation. Students develop strategies for solving division problems (three-digit divided by two-digit), which involve making groups of the divisor. These problems are presented both in story contexts and numerically.

Penny Jars and Plant Growth: Patterns, Functions, and Change

Students explore situations in which two quantities change in relation to each other. They work with changes over time, such as increasing or decreasing speed or the growth of a plant, and situations of constant change, such as how the number of windows in a building depends on the height of the building if every floor has the same number of windows. Students create and interpret graphs and tables for these linear and nonlinear functions and connect these graphs to the situations they represent.