



## An Overview of Grade 4: 2<sup>nd</sup> Edition<sup>1</sup>

The fourth grade curriculum is organized into 9 units that offer from 3 to 5 weeks of work, focused on the area(s) of mathematics identified in the unit's subtitle. Because units build on each other, both within and across strands, they are designed for use in the sequence shown.

Unit Title	Number of Sessions
<b>Factors, Multiples, and Arrays</b> Multiplication and Division 1	14
<b>Describing the Shape of the Data</b> Data Analysis and Probability	17
<b>Multiple Towers and Division Stories</b> Multiplication and Division 2	20
<b>Size, Shape, and Symmetry</b> 2-D Geometry and Measurement	20
<b>Landmarks and Large Numbers</b> Addition, Subtraction, and the Number System	24
<b>Fraction Cards and Decimal Squares</b> Fractions and Decimals	20
<b>Moving Between Solids and Silhouettes</b> 3-D Geometry and Measurement	14
<b>How Many Packages? How Many Groups?</b> Multiplication and Division 3	16
<b>Penny Jars and Plant Growth</b> Patterns, Functions, and Change	15

Note that the *Investigations* curriculum assumes that each school day includes 70-75 minutes of math: one hour on the day's Session, and 10-15 minutes on Ten-Minute Math. Designed to fit within the calendar of a typical school year, fourth grade includes a total of 160 sessions (or approximately 32 weeks of work). This provides some leeway for going further with particular ideas and/or accommodating local circumstances. Although pacing will vary somewhat in response to variations in school calendars, needs of students, your school's years of experience with the curriculum, and other local factors, following the suggested pacing and sequence will ensure that students benefit from the way mathematical ideas are introduced, developed, and revisited across the year.

<sup>1</sup> This document applies to the 2nd edition of *Investigations* (2008, 2012). See <http://investigations.terc.edu/CCSS/> for changes when implementing *Investigations and the Common Core Standards*.

## An Overview of the Math in Fourth Grade\*

**Number and Operations: Whole Numbers** Work focuses on extending knowledge of the base-ten number system to 10,000. Multiplication and division are the major focus of students' work in number and operations. Students use models, representations, and story contexts to help them understand and solve multiplication and division problems. In addition and subtraction, students refine and compare strategies for solving problems with 3-4 digits. By the end of the year, students are expected to solve addition and subtraction problems efficiently; know their multiplication combinations to  $12 \times 12$  and use the related division facts, and to solve 2- x 2-digit multiplication problems and division problems with 1-2 digit divisors.

**Number and Operations: Fractions and Decimals** The major focus of work is on building students' understanding of the meaning, order, and equivalencies of fractions and decimals. They work with fractions in the context of area, as a group, and on a number line. Students are introduced to decimal fractions as an extension of the place value system. They reason about fraction comparisons, order fractions on a number line, and use representations and reasoning to add fractions and decimals.

**Geometry and Measurement** Students expand their understanding of how the attributes of 2-D and 3-D shapes determine their classification. Students consider attributes of 2-D shapes, such as number of sides, the length of sides, parallel sides, and the size of angles. Students also describe attributes and properties of geometric solids (3-D shapes). Measurement work includes linear measurement (with both U.S standard and metric units), area, angle measurement, and volume. Students work on understanding volume by structuring and determining the volume of a rectangular prism.

**Patterns and Functions** Students create tables and graphs for situations with a constant rate of change and use them to compare related situations. By analyzing tables and graphs, students consider how the starting amount and the rate of change define the relationship between the two quantities and develop rules that govern that relationship.

**Data Analysis and Probability** Students collect, represent, describe, and interpret numerical data. Their work focuses on describing and summarizing data for comparing two groups. They develop conclusions and make arguments, based on the evidence they collect. In their study of probability, students describe and predict what events are impossible, unlikely, likely, or certain. Students reason about how the theoretical chance (or *theoretical probability*) of, for example, rolling 1 on a number cube compares to what actually happens when a number cube is rolled repeatedly.

### Ongoing Review and Practice

Approximately 10 minutes per day is spent on one of six Ten-Minute Math activities, which offer practice and review of key concepts in place value, number and operations, data, and geometry.

Homework is provided 3-5 times a week at. In addition, each session includes a page for Daily Practice that can be used either for additional homework or for in-class practice. The *Student Math Handbook* illustrates important words and ideas and can be used for review.

\* **Note:** For more detailed information on the math at this grade level, see *Mathematics in Fourth Grade* and *Grade 4 Scope and Sequence in Implementing Investigations in Grade 4*.

## Over the course of fourth grade, students...

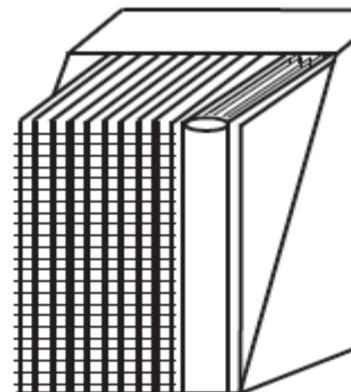
- Use array cards to learn how and why the distributive property can be applied when solving multiplication problems.
- Build towers of multiples to study the relationship between multiplication and division and how this relationship can be used to solve division problems. For example,  $30 \times 13 = 390$  and  $390 \div 30 = 13$ .
- Describe and construct theories about three sets of “Mystery Data” that each represent the height or length of a group of living things.
- Use U.S. standard and metric units to measure the length of their classroom and consider why their measurements differ.
- Consider the attributes of 2-D shapes as they play *Guess My Rule* with Power Polygons and Shape Cards.
- Study the area of irregular figures by finding halves of *Crazy Cakes*.
- Study the structure of the base 10 number system as they use one hundred 100s charts to make a class 10,000 chart.
- Use the context of travel stories as a way to solve subtraction problems, and understand the relationship between addition and subtraction.
- Shade in portions of rectangles ( $4 \times 6$ ,  $5 \times 12$ ,  $10 \times 10$ ) to represent and compare fractions and decimals.
- Draw 3 different perspectives of cube structures as they move between 2-D and 3-D shapes.
- Learn how knowing  $50 \times 70$  helps them solve more difficult multiplication problems like  $55 \times 74$ .
- Make a representation to show (prove) that doubling one factor and halving the other factor results in an equivalent expression.
- Create tables and write rules to show the relationship between the number of “windows” and the number of floors on different cube buildings.

## The Components

In order to teach the fourth grade curriculum, a teacher needs the Core Curriculum Package, Student Activity Books, and the fourth grade manipulatives. The following table describes all of the components available at fourth grade:

The **Core Curriculum Package** at Grade 4. This includes:

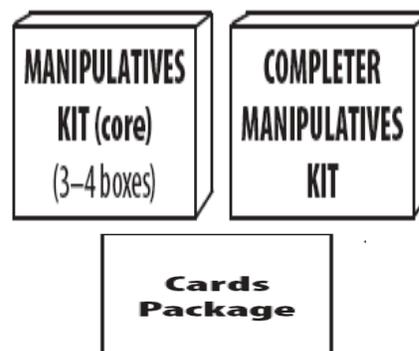
- the nine **curriculum units** listed above.
- **Implementing Investigations in Grade 4**. This book helps teachers get started and provides useful ongoing support.
- a **Resources Binder**. Available in English or Spanish, this contains all of the transparencies and masters (e.g. assessment masters, game directions, family letters), in hard copy and on a CD. It also includes the *LogoPaths* software, used in the Grade 4 2-D Geometry unit and recommended for additional use throughout the year.



Also available separately: a **Spanish Teaching Companion** that presents vocabulary and teacher dialogue in Spanish, and an **Answer Key**.

There are three kits available for a class of 32 students:

- The Grade 4 **Manipulatives Kit** includes all of the student and overhead manipulatives needed to teach the third grade units.
- The Grade 4 **Completer Manipulatives Kit** includes only the materials that are new to the second edition.
- The Grade 4 **Cards Package** provides manufactured decks of the most-used card sets. (These can also be made from Masters in the Resources Binder.)



The following resources are available for students:

- **Student Activity Book(s)** for each student. Available by unit or for the whole year, this consumable resource contains all of the pages students need, including: activity sheets, recording sheets for math games, homework sheets, and practice pages. It is available in English or Spanish.
- **Student Math Handbooks** for each student and/or several for the classroom. This hardcover book, which illustrates math words and ideas and provides game directions, is also available online and in Spanish.

