


## Grade 4 Unit Overviews

| Expanded Form                                                                                                             | All-Partials                                                                              | Compact                                                                        |
|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| $\begin{array}{r} 552 = 500 + 50 + 2 \\ \times 6 \quad \quad \quad \times 6 \\ \hline 3000 + 300 + 12 = 3312 \end{array}$ | $\begin{array}{r} 552 \\ \times 6 \\ \hline 12 \\ 300 \\ 3000 \\ \hline 3312 \end{array}$ | $\begin{array}{r} \phantom{0}31 \\ 552 \\ \times 6 \\ \hline 3312 \end{array}$ |

Solving a problem using different paper-and-pencil methods.

$$\begin{aligned} 299 \times 4 &= (300 \times 4) - 4 \\ &= 1200 - 4 \\ &= 1196 \end{aligned}$$



Solving a problem using a mental math strategy.

## Unit 1: Data About Us

### 12–14 Days

Students explore ways to model the relationship between variables as they get to know a fictional Room 204 and their own classmates. They look at survey data for Room 204 to design their own survey questions to analyze and represent. Students represent these relationships in bar graphs, point graphs, and measures of central tendency (mean and mode). Students then make generalizations and predictions.

| Focus on Major Work <sup>i</sup> |                                                               |
|----------------------------------|---------------------------------------------------------------|
| 4.OA.A                           | Use the four operations with whole numbers to solve problems. |
| 4.NF.A                           | Extend understanding of fraction equivalence and ordering.    |
| Supporting Work                  |                                                               |
| 4. MD.B                          | Represent and interpret data.                                 |
| Mathematical Practices           |                                                               |
| MP1, 2, 3, 4, 5, 6, 7            |                                                               |

## Unit 2: Geometric Investigations

### 9–10 Days

Students review the concepts of area and perimeter as they investigate the relationships between perimeter, area, and side length in rectangular shapes. Students collect, graph, and analyze data using data tables and line graphs to design runways and helipads for the imaginary city of Antopolis. In the next unit, students use area models to multiply and analyze numbers.

| Focus on Major Work    |                                                               |
|------------------------|---------------------------------------------------------------|
| 4.OA.A                 | Use the four operations with whole numbers to solve problems. |
| Supporting Work        |                                                               |
| 4. MD.B                | Represent and interpret data.                                 |
| Mathematical Practices |                                                               |
| MP1, 2, 3, 4, 5, 7, 8  |                                                               |

### Unit 3: Products and Factors

17–21 Days

Students work with the array model for multiplication and investigate factors of numbers. They begin by exploring the dimensions of rectangular arrays. That leads to an investigation of factors, multiples, primes, and squares. Students then are challenged to find the prime factors of a number using factor trees and exponents.

| Focus on Major Work    |                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------|
| 4.OA.A                 | Use the four operations with whole numbers to solve problems.                                 |
| 4.NTB.B                | Use place value understanding and properties of operations to perform multi-digit arithmetic. |
| Supporting Work        |                                                                                               |
| 4.OA.B                 | Gain familiarity with factors and multiples.                                                  |
| Mathematical Practices |                                                                                               |
| MP1, 2, 3, 8           |                                                                                               |

### Unit 4: Numbers and Number Operations

18–23 Days

Building on experiences from previous grades, students deepen their understanding of place value and expand their ability to add, subtract, and multiply multidigit numbers. Students make connections between base-ten representations and paper-and-pencil methods. They also further develop their mental math strategies. The goal of this unit is to improve students' skills and understanding of concepts so they can choose appropriate methods to solve problems efficiently and accurately.

| Focus on Major Work    |                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------|
| 4.OA.A                 | Use the four operations with whole numbers to solve problems.                                 |
| 4.NTB.A                | Generalize place value understanding for multi-digit whole numbers.                           |
| 4.NTB.B                | Use place value understanding and properties of operations to perform multi-digit arithmetic. |
| Mathematical Practices |                                                                                               |
| MP1, 2, 3, 4, 5, 6, 7  |                                                                                               |

## Unit 5: Using Data to Predict

16–19 Days

Students look for patterns in the relationship between variables. They review how to represent these variables in graphs and tables and then use those patterns to make predictions and generalizations. Students also explore mean by manipulating models (e.g., evening out towers, folding strips). They then compare the bounce height to the drop height of a ball and use that data to make predictions and reason about multiplicative relationships. Students also explore these relationships in function machines as they generalize patterns as rules.

| Focus on Major Work      |                                                                                                           |
|--------------------------|-----------------------------------------------------------------------------------------------------------|
| 4.OA.A                   | Use the four operations with whole numbers to solve problems.                                             |
| 4.NTBA                   | Generalize place value understanding for multi-digit whole numbers.                                       |
| 4.NF.A                   | Extend understanding of fraction equivalence and ordering.                                                |
| Supporting Work          |                                                                                                           |
| 4.MD.A                   | Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. |
| 4. MD.B                  | Represent and interpret data.                                                                             |
| Mathematical Practices   |                                                                                                           |
| MP1, 2, 3, 4, 5, 6, 7, 8 |                                                                                                           |

## Unit 6: Place Value and Large Numbers

13–17 Days

This unit provides many opportunities for students to explore number meaning and to develop number sense. Students collect large numbers from a variety of resources that they then organize using benchmarks, then on a number line, and then with base-ten pieces. Students then estimate quantities using Mystery Jars and referents and use benchmarks and number lines to round large numbers. Students will also analyze the non-linear patterns while working with large numbers and exponents. In this unit, students will also assess their fluency with all the multiplication facts and start the systematic review of the division facts.

| Focus on Major Work    |                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------|
| 4.OA.A                 | Use the four operations with whole numbers to solve problems.                                 |
| 4.NTBA                 | Generalize place value understanding for multi-digit whole numbers.                           |
| 4.NTB.B                | Use place value understanding and properties of operations to perform multi-digit arithmetic. |
| Additional Work        |                                                                                               |
| 4.OA.C                 | Generate and analyze patterns.                                                                |
| Mathematical Practices |                                                                                               |
| MP1, 2, 3, 6, 7        |                                                                                               |

## Unit 7: Patterns in Multiplication

14–16 Days

Students explore the order of operations, divisibility rules, and multiplication methods and strategies for larger numbers. Students build on the invented mental math strategies and paper-and-pencil methods already developed to extend these strategies to larger numbers (e.g., expanded form, all-partials, compact, rectangle model, estimation, and mental math strategies). Students collect a variety of strategies and then build their own strategies menu using the Multiplication Strategies Menu for Larger Numbers as a framework. This work with multiple methods and strategies helps increase flexibility and efficiency in solving computational problems.

| Focus on Major Work    |                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------|
| 4.OA.A                 | Use the four operations with whole numbers to solve problems.                                 |
| 4.NTB.A                | Generalize place value understanding for multi-digit whole numbers.                           |
| 4.NTB.B                | Use place value understanding and properties of operations to perform multi-digit arithmetic. |
| Supporting Work        |                                                                                               |
| 4.OA.B                 | Gain familiarity with factors and multiples.                                                  |
| Mathematical Practices |                                                                                               |
| MP1, 2, 3, 4, 5, 6, 7  |                                                                                               |

## Unit 8: Exploring Fractions

20–25 Days

Students use multiple representations and real-world contexts to support their development of the concepts related to fractions. Students start by representing fractions with fraction strips, then transition to number lines, then circle pieces and other area models and finally add a discrete model to their cadre of representations. Students then make connections and translate between these representations to compare, order, and find equivalent fractions. Students also look for patterns in repeated reasoning to develop strategies to add, subtract, and multiply fractions.

| Focus on Major Work    |                                                            |
|------------------------|------------------------------------------------------------|
| 4.NF.A                 | Extend understanding of fraction equivalence and ordering. |
| 4.NF.B                 | Build fractions from unit fractions.                       |
| Mathematical Practices |                                                            |
| MP1, 2, 3, 4, 5, 6, 7  |                                                            |

## Unit 9: Angles, Lines, and Shapes

16–21 Days

Students explore the nature of two-dimensional geometric elements including lines, angles, and polygons. Students also discover relationships within and among these elements as they advance their understanding through stages, from basic intuition to analysis and informal deduction.

| Additional Work        |                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------|
| 4.MD.C                 | Geometric measurement: understand concepts of angle and measure angles.                          |
| 4.G.A                  | Draw and identify lines and angles, and classify shapes by properties of their lines and angles. |
| Mathematical Practices |                                                                                                  |
| MP1, 2, 3, 4, 5, 6     |                                                                                                  |

## Unit 10: Using Decimals

13–18 Days

Students will work with decimals. The activities focus on developing a better understanding of the meaning of decimals and on being able to translate between decimals and their fraction equivalents. Students will use decimals to measure lengths in meters, decimeters, centimeters, and millimeters. Students will then connect the meterstick representation to base-ten pieces, fraction circle pieces, and number lines. These models will help students compare and do simple computations with decimals.

| Focus on Major Work    |                                                                                                           |
|------------------------|-----------------------------------------------------------------------------------------------------------|
| 4.NF.A                 | Extend understanding of fraction equivalence and ordering.                                                |
| 4.NF.C                 | Understand decimal notation for fractions, and compare decimal fractions                                  |
| Supporting Work        |                                                                                                           |
| 4.MD.A                 | Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. |
| 4. MD.B                | Represent and interpret data.                                                                             |
| Additional Work        |                                                                                                           |
| 4.OA.C                 | Generate and analyze patterns.                                                                            |
| Mathematical Practices |                                                                                                           |
| MP1, 2, 3, 5, 6, 7     |                                                                                                           |

## Unit 11: Multiplication with Larger Numbers

9–11 Days

Students use flexible strategies and methods for multiplication of multidigit numbers. Students use mental math, rectangle models, expanded form, the all-partials method, and the compact method to multiply two-digit by two-digit numbers. They develop estimation and mental math strategies as a way to check reasonableness of answers or to compute quickly. Students also develop methods to choose appropriately among the strategies.

| Focus on Major Work    |                                                                                                           |
|------------------------|-----------------------------------------------------------------------------------------------------------|
| 4.OA.A                 | Use the four operations with whole numbers to solve problems.                                             |
| 4.NTB.A                | Generalize place value understanding for multi-digit whole numbers.                                       |
| 4.NTB.B                | Use place value understanding and properties of operations to perform multi-digit arithmetic.             |
| Supporting Work        |                                                                                                           |
| 4.OA.B                 | Gain familiarity with factors and multiples.                                                              |
| 4.MD.A                 | Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. |
| Mathematical Practices |                                                                                                           |
| MP1, 2, 3, 4, 5, 6, 7  |                                                                                                           |

## Unit 12: Division

8–10 Days

Students extend and apply students' knowledge of division to solve problems involving division of 2- and 3- digit numbers by single-digit numbers. Students use column models and rectangle models to develop their conceptual understanding of division. These models are used to develop estimation strategies, which will then be used with more efficient paper-and-pencil methods (e.g., partial quotients).

| Focus on Major Work    |                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------|
| 4.OA.A                 | Use the four operations with whole numbers to solve problems.                                 |
| 4.NTB.A                | Generalize place value understanding for multi-digit whole numbers.                           |
| 4.NTB.B                | Use place value understanding and properties of operations to perform multi-digit arithmetic. |
| Mathematical Practices |                                                                                               |
| MP1, 2, 4, 6           |                                                                                               |

## Unit 13: Using Patterns

### 10–15 Days

Students explore, analyze, and extend patterns represented with tables, graphs, symbols, words and situations. Students use these models to hone their ability to estimate the volume of small objects in the context of the Fill It First Game. Decreasing relationships are then explored in Lesson 6 Sandwich Mass. Within these two contexts, students then use the relationship between larger and smaller units to solve problems, look for patterns in function tables, and make predictions and generalizations.

| Focus on Major Work      |                                                                                                           |
|--------------------------|-----------------------------------------------------------------------------------------------------------|
| 4.NF.C                   | Understand decimal notation for fractions, and compare decimal fractions                                  |
| Supporting Work          |                                                                                                           |
| 4.OA.B                   | Gain familiarity with factors and multiples.                                                              |
| 4.MD.A                   | Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. |
| 4. MD.B                  | Represent and interpret data.                                                                             |
| Additional Work          |                                                                                                           |
| 4.OA.C                   | Generate and analyze patterns.                                                                            |
| Mathematical Practices   |                                                                                                           |
| MP1, 2, 3, 4, 5, 6, 7, 8 |                                                                                                           |

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<sup>i</sup> The *K–8 Publisher’s Criteria for the Common Core State Standards for Mathematics* identifies every cluster of standards as being either major work, supporting work, or additional work for its respective grade level. It calls for at least 65% of time to be devoted to the major work of the grade with supporting work and additional work engaging students in the major work of the grade where appropriate. See <http://achievethecore.org/shifts-mathematics> for more information.