

4TH GRADE MATHEMATICS

CURRICULUM GUIDE

BIG IDEAS

- ◆ Understanding why multiplication procedures work helps one to recognize and accurately solve problems that involve multiplying.
 - ◆ Fluency and accuracy with procedures for multiplying numbers helps us to efficiently solve problems.
 - ◆ Properties and relationships among the number operations make it possible to more effectively solve problems.
 - ◆ Numbers between 0 and 1 can be represented and compared in both fraction and decimal form.
 - ◆ Area as an attribute that can be quantified by finding the number of same-sized units within a given region.
 - ◆ Measurement formulas allow us to complete measurement calculations efficiently and accurately without direct access to the objects being measured.
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THEMATIC FOCUS

- ◆ Math classrooms are lively places for learning where students receive a rich diet of the following:
 - The use of mathematics to *solve problems*.
 - Application of *logical reasoning* to justify procedures and solutions.
 - Design and analyze multiple *representations*, make *connections* in and out of school.
 - See the National Council of Teachers of Mathematics (NCTM) [PRINCIPLES & STANDARDS FOR SCHOOL MATHEMATICS](#) for further information.
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UNITS OF STUDY

- ◆ Mastery of multiplication and related division facts
 - ◆ Models of multiplication
 - ◆ Multiplication of multidigit numbers
 - ◆ Decimal notation and place value
 - ◆ Comparing and ordering decimals
 - ◆ Fractional and decimal equivalents
 - ◆ Area concept and measurement
 - ◆ Classifying angles
 - ◆ Estimating whole number & fractional sums and differences
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CONCEPTS AND SKILLS

It is essential that the following concepts and skills be addressed in contexts that promote problem solving, reasoning, communication, making connections and designing and analyzing representations. See [FOCAL POINTS](#) for more information about grade level content for mathematics.

4.1 Number and Operations: Develop an understanding of decimals, including the connections between fractions and decimals

- Extend the base-ten system to read, write, and represent decimal numbers (to the hundredths) between 0 and 1, between 1 and 2, etc. (4.1.1)
- Use models to connect and compare equivalent fractions and decimals. (4.1.2)
- Determine decimal equivalents or approximations of common fractions. (4.1.3)
- Compare and order fractions and decimals. (4.1.4)
- Estimate decimal or fractional amounts in problem solving. (4.1.5)
- Represent money amounts to \$10.00 in dollars and cents, and apply to situations involving purchasing ability and making change. (4.1.6)

CONCEPTS AND SKILLS (CONTINUED)

4.2 Number and Operations and Algebra: Develop fluency with multiplication facts and related division facts, and with multi-digit whole number multiplication

- Apply with fluency multiplication facts to 10 times 10 and related division facts. (4.2.1)
- Apply understanding of models for multiplication (e.g., equal-sized groups, arrays, area models, equal intervals on the number line), place value, and properties of operations (commutative, associative, and distributive). (4.2.2)
- Select and use appropriate estimation strategies for multiplication (e.g., use benchmarks, overestimate, and underestimate, round) to calculate mentally based on the problem situation when computing with whole numbers. (4.2.3)
- Develop and use accurate, efficient, and generalizable methods to multiply multi-digit whole numbers. (4.2.4)
- Develop fluency with efficient procedures for multiplying multi-digit whole numbers and justify why the procedures work on the basis of place value and number properties. (4.2.5)

4.3 Measurement: Develop an understanding of area and determine the areas of two-dimensional shapes

- Recognize area as an attribute of two-dimensional regions. (4.3.1)
- Determine area by finding the total number of same-sized units of area that cover a shape without gaps or overlaps. (4.3.2)
- Recognize a square that is one unit on a side as the standard unit for measuring area. (4.3.3)
- Determine the appropriate units, strategies, and tools to solving problems that involve estimating or measuring area. (4.3.4)
- Connect area measure to the area model used to represent multiplication and use this to justify the formula for area of a rectangle. (4.3.5)
- Find the areas of complex shapes that can be subdivided into rectangles. (4.3.6)
- Solve problems involving perimeters and areas of rectangles and squares. (4.3.7)
- Recognize that rectangles with the same area can have different perimeters and that rectangles with the same perimeter can have different areas. (4.3.8)

◆ **4th Grade Connections**

The following connections to the concepts and skills bring in other important topics in meaningful ways. For example, the grade 2ND Grade Connections highlight the fact that the measurement focal point for grade 2 (“Developing an understanding of linear measurement and facility in measuring lengths”) includes work with applications and models using the shapes from the geometry focal point for grade 1 (“Composing and decomposing geometric shapes”). At the same time, students in grade 2 continue to use vocabulary and spatial reasoning that will be essential for learning the content specified in the geometry focal point for grade 3 (“Describing and analyzing properties of two-dimensional shapes”). Because a curriculum that is integrated and internally connected (see [FOCAL POINTS OVERVIEW](#) for additional information) in this way uses related concepts and skills to support and enrich one or more focal points at a grade level, it has the potential to maximize students’ learning.

- Algebra
 - Numeric patterns involving all operations
 - Create rules to describe the patterns
- Geometry
 - Symmetry
 - Congruency
 - Transformations
 - Tessellations
- Measurement
 - Measure and classify angles

CONCEPTS AND SKILLS (CONTINUED)

- Data Analysis
 - Frequency tables
 - Bar graphs
 - Picture graphs
 - Line plots
 - Stem-and-leaf plots
 - Number and Operations
 - Represent numbers to 100,000
 - Use estimation to determine relative sizes and distances
 - Devise strategies for multi-digit division
 - Recognize equivalent fractions
 - Simplify fractions
- ◆ **Math Work Samples & Assessment** In 4th grade, students should be provided multiple opportunities to complete math work samples and are required to complete at least one teacher-scored math work sample based on the official scoring guide. 4th graders are also required to take the Oregon Assessment of Knowledge and Skills (OAKS) test in the spring (see [Assessment](#) section for math scoring guides, sample tasks, and additional information).
- ◆ **Problem Solving** (see [Problem Solving](#) section for definitions, grade level descriptions, and instructional resources)
- ◆ **Math Placement** (see [Placement](#) section for course flowcharts, placement criteria, and additional information)
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ESSENTIAL QUESTIONS

- ◆ Why is it important to have quick recall of multiplication/division facts?
 - ◆ Why learn mathematical formulas? What are they used for?
 - ◆ How do estimation and formulas work together?
 - ◆ How are fractions and decimals related?
 - ◆ How are multiplication and division related?
 - ◆ How many ways are there to find the area of a two dimensional shape?
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ESSENTIAL SKILLS

- ◆ Apply mathematics in a variety of settings
 - Interpret a situation and apply workable mathematical concepts and strategies, using appropriate technologies where applicable.
 - Produce evidence, such as graphs, data, or mathematical models, to obtain and verify a solution.
 - Communicate and defend the verified process and solution, using pictures, symbols, models, narrative or other methods.
- ◆ Think critically and analytically. This skill includes all of the following:
 - Identify and explain the key elements of a complex event, text, issue, problem or phenomenon.
 - Develop a method to explore the relationships between the key elements of a complex event, text, issue, problem or phenomenon.
 - Propose defensible conclusions that address multiple and diverse perspectives.
 - Evaluate the strength of conclusions, differentiating reasoning based on facts from reasoning based on opinions.
 - See [ESSENTIAL SKILLS](#) for more information about ODE requirements.