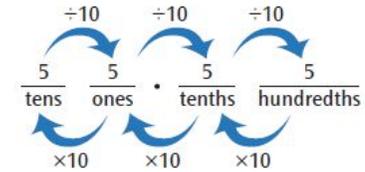


Notice, Conjecture, and Generalize Mathematical Properties

The main focus in fifth grade is to have children extend their understanding of the base-ten system from whole numbers to decimals, focusing on the relationship between adjacent place values, how numbers compare, and how numbers round for decimals to thousandths.

Your child will continue to model mathematical situations, including a variety of work problems including both whole numbers, fractions, and decimals. When making sense of problems and solution strategies, encourage your child to reason that in multi-digit whole numbers, a digit in one place represents 10 times what it represents in the place to its right and 1/10 of what it represents in the place to its left. As your child develops understanding that in a multi-digit number, a digit in one place represents 1/10 of what it represents in the place to its left, they also reinforce their understanding of multiplying a quantity by a fraction.



Example of a Task [Critique how Josie Represents Tenths and Hundredths](#)

Example	5.NBT.2▲
Students might write:	
$36 \times 10 = 36 \times 10^1 = 360$	
$36 \times 10 \times 10 = 36 \times 10^2 = 3600$	
$36 \times 10 \times 10 \times 10 = 36 \times 10^3 = 36,000$	
$36 \times 10 \times 10 \times 10 \times 10 = 36 \times 10^4 = 360,000$	
Students might think or say:	
"I noticed that every time I multiplied by 10, I placed a zero at the end of the number. That makes sense because each digit's value became 10 times larger. To make a digit 10 times larger, I have to move it one place value to the left. When I multiplied 36 by 10, the 30 became 300. The 6 became 60 (or the 36 became 360)."	
Adapted from ADE 2010.	

Powers of 10 is a fundamental aspect of the base-ten system. Your child will extend their understanding of place value to explain patterns in the number of zeros of the product when multiplying a number by powers of 10, including the placement of the decimal point. The use of whole-number exponents to denote powers of 10 is new to fifth-graders.

Your child will build on their understandings from grade four to read, write, and compare decimals to thousandths. They will learn to connect this work with prior understanding of decimal notations for fractions and addition of fractions with denominators of 10 and 100.

Encourage your child to use concrete models or drawings and number lines to extend this understanding of decimals to the thousandths place. Models may include base-ten blocks, place-value charts, grids, pictures, math drawings, and manipulatives. Encourage your child to read decimals using fractional language and write decimals in fractional form, as well as in expanded notation. This investigation leads them to understand the equivalence of decimals (e.g., $08=0.80=0.800$). [Example Task: Are These Equivalent to 9.52?](#)

4. Use an area model to multiply decimals.

Show that $2.4 \times 1.3 = 3.12$.

Solution: "I drew a picture that shows a rectangle with dimensions of 1.3 units by 2.4 units. I know how to break up and keep track of smaller units, like tenths and hundredths. The partial products appear in my picture."

Your child's proficiency with fractions is essential to success in middle school. A critical area is developing fluency with addition and subtraction of fractions, including adding and subtracting fractions with unlike denominators. Also your child will build an understanding of multiplication of fractions and in limited cases division of fractions. ([Illustrative Mathematics: Fraction Progression Videos, Grades 3-5](#))

Major Work - Multiplication and Division of Whole Numbers and Fractions		
Number & Operations in Base Ten	Number & Operations - Fractions	Measurement and Data
<ul style="list-style-type: none"> Understand the place value system. Perform operations with multi-digit whole numbers and with decimals to hundredths. <p>Addition and subtraction situations by grade level</p> <p>Multiplication and Division Situations</p>	<ul style="list-style-type: none"> Use equivalent fractions as a strategy to add and subtract fractions. Apply and extend previous understandings of multiplication and division to multiply and divide fractions. <p>Note: This is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions</p> <p>Division of a fraction by a fraction is not a requirement at this grade.</p>	<ul style="list-style-type: none"> Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.
Required Fluency Expectations		
<p>Multi-digit multiplication whole numbers using the standard algorithm.</p> <p>The word fluent is used in the standards to mean “reasonably fast and accurate” and possessing the ability to use certain facts and procedures with enough facility that using such knowledge does not slow down or derail the problem solver as he or she works on more complex problems. Procedural fluency requires skill in carrying out procedures flexibly, accurately, efficiently, and appropriately. Developing fluency in each grade may involve a mixture of knowing some answers, knowing some answers from patterns, and knowing some answers through the use of strategies.</p>		

For more details see [CA Mathematics Standards, Fifth Grade, p. 34-39](#)

Speak Like a Mathematician

Mathematical discussion is key to making meaning. You can support your child’s mathematical thinking by having informal conversations about mathematics. Encourage your child to articulate their thinking about number quantities, comparisons, patterns, and solving problems when doing daily tasks, playing games, going on walks, or errands together.

- [Growth Mindset Feedback Tool](#)
Growth mindset language motivates learners to ensure they remain persistent, resilient, and focused on the process of learning. It is important to give learners feedback about how their process leads to a result so they can understand that their abilities will develop with effort.
- Have discussions with your child about how they are thinking about the mathematics in the problem they are solving. The [Achievement Level Descriptors](#) describe four areas you can discuss with your child when solving mathematical tasks; Applying mathematical concepts and procedures; problem

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solving/ modeling and data analysis; communicating reasoning. Phil Daro describes further in the Vimeo Video: [Answer Getting vs. Learning Mathematics](#) (5 minutes)

- Encourage your child to use academic language when discussing how they are thinking about and solving mathematical tasks. [CA Framework Mathematics Glossary: Terms, Tables, and Illustrations](#).
- Provide opportunity to have your child describe numerical expressions without evaluating them. For example, they express the calculation “add 8 and 7, then multiply by 2” as $(8 + 7) \times 2$. Without calculating a sum or a product they recognize $3 \times (18932 + 921)$ is three times as large as $18932 + 921$. This helps your child think about expressions.

Think Like a Mathematician ([Standards for Mathematical Practice, see p. 3, 6-8](#))

The Standards for Mathematical Practice go hand-in-hand with the content standards, describing varieties of expertise that learners are expected to practice when learning and doing mathematics throughout K-12.

Standards for Mathematical Practice	Examples - What you can do at home
Make sense of problems and persevere in solving them.	In grade five, children solve problems by applying their understanding of operations with whole numbers, decimals, and fractions that include mixed numbers. They solve problems related to volume and measurement conversions. Children seek the meaning of a problem and look for efficient ways to represent and solve it. For example, “Sonia had $2 \frac{1}{2}$ sticks of gum. She promised her brother that she would give him of a stick of gum. How much will she have left after she gives her brother the amount she promised?” Encourage your child to check their thinking by asking themselves questions such as these: “What is the most efficient way to solve the problem?”, “Does this make sense?”, “Can I solve the problem in a different way?”
Reason abstractly and quantitatively.	Children recognize that a number represents a specific quantity. They connect quantities to written symbols and create logical representations of problems, considering appropriate units and the meaning of quantities. They extend this understanding from whole numbers to their work with fractions and decimals. You can support your child’s reasoning by asking questions such as these: “What do the numbers in the problem represent?”, “What is the relationship of the quantities?” Fifth graders are expected to write simple expressions that record calculations with numbers and represent or round numbers using place-value concepts. For example, a child might use abstract and quantitative thinking to recognize, without calculating the quotient, that $0.5 \times (300 \div 15)$ is half of $(300 \div 15)$.
Construct viable arguments and critique the reasoning of others.	Fifth graders are expected to construct arguments by using visual models such as objects and drawings. They explain calculations based upon models, properties of operations, and rules that generate patterns. They demonstrate and explain the relationship between volume and multiplication. They refine their mathematical communication skills as they participate in mathematical discussions involving questions such as “How did you get that?” and “Why is that true?” They explain their thinking to others and respond to others’ thinking. Encourage your child to use various strategies to solve problems, and then defend and justify their work to others. An example of a problem that can be solved in multiple ways: “Two after-school clubs are having pizza parties. The teacher will order 3 pizzas for every 5 students in the math club and 5 equally sized pizzas for every 8 students

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	<p>on the student council. How much pizza will each student get at the respective parties? If a student wants to attend the party where she will get the most pizza (assuming the pizza is divided equally among the students at the parties), which party should she attend?"</p>
<p>Model with mathematics.</p>	<p>Encourage your child to experiment with representing problem situations in multiple ways—for example, by using numbers, mathematical language, drawings, pictures, objects, charts, lists, graphs, and equations. You might ask your child, "How would it help to create a diagram, chart, or table?" or "What are some ways to represent the quantities?" Remember, children need multiple opportunities to represent problems in various ways and explain the connections. Students in grade five are expected to evaluate their results in the context of the situation and explain whether answers to problems make sense. Ask your child does their solution strategy fit the context of the problem? Encourage your child to evaluate the utility of models they see and draw and can determine which models are the most useful and efficient for solving particular problems.</p>
<p>Use appropriate tools strategically.</p>	<p>Encourage your child to consider available tools, including estimation, and decide which tools might help them solve mathematical problems. For instance, a child may use unit cubes to fill a rectangular prism and then use a ruler to measure the dimensions to find a pattern for volume using the lengths of the sides. They use graph paper to accurately create graphs, solve problems, or make predictions from real-world data.</p>
<p>Attend to precision.</p>	<p>Encourage your child to continue to refine their mathematical communication skills by using clear and precise language in their discussions with you and others and in their own reasoning. You might ask your child, "How do you know your solution is reasonable?" Encourage your child to use appropriate terminology when they refer to expressions, fractions, geometric figures, and coordinate grids. Ask them, "What symbols or mathematical notations are important in this problem?" Remind your child to be precise and specify units of measure and state the meaning of the symbols they choose. For instance, to determine the volume of a rectangular prism, a child will record their answers in cubic units.</p>
<p>Look for and make use of structure.</p>	<p>Children look closely to discover a pattern or structure. For instance, they use properties of operations as strategies to add, subtract, multiply, and divide with whole numbers, fractions, and decimals. They examine numerical patterns and relate them to a rule or a graphical representation. Teachers might ask, "How do you know if something is a pattern?" or "What do you notice when ___?"</p> <p>Encourage your child to break divisors and dividends into sums of multiples of base-ten units, this will help them to see and make use of the structure of base-ten.</p>
<p>Look for and express regularity in repeated reasoning.</p>	<p>Encourage your child to use repeated reasoning to understand algorithms and make generalizations about patterns. Children connect place value and their prior work with operations to understand and use algorithms to extend multi-digit division from one-digit to two-digit divisors and to fluently multiply multi-digit whole numbers. They use various strategies to perform all operations with decimals to hundredths, and they explore operations with fractions with visual models and begin to formulate generalizations. Teachers might ask, "Can you explain how this strategy works in other situations?" or "Is this always true, sometimes true, or never true?"</p>

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Table above IUSD adapted from [CA Mathematics Framework, Grade 5](#)

Course Materials

- [IUSD Mathematics TextBooks 2016-17](#) (List of current textbooks)

Types of Arithmetic Situations

Grades K-2 focused on & upper grades continue to review: [Addition and subtraction situations by grade level](#)

Grades 3-5 focus on & upper grades continue to review: [Multiplication and Division Situations by Grade Level](#)

Academic Language

- [CA Framework Mathematics Glossary: Terms, Tables, and Illustrations.](#)
- [Math Visual Vocabulary Cards, K-7](#)

Standards for Mathematical Practice (SMP) Translations

- SMP - [English](#)
- SMP - [Chinese](#)
- SMP - [Korean](#)
- SMP - [Armenian](#)
- SMP - [Tagalog](#)
- SMP - [Spanish](#)

Math Literature

Books create contexts for math. The mathematical problems and solutions that children encounter in books are deeper and more nuanced than most of the word problems they encounter, thus providing opportunity for students to be captivated by the problem and eager to devise a solution.

- University of Chicago [School Math Project - Fifth Grade Reading List](#) (organized by topic)
- Marilyn Burns List of [Math Literature \(All ages\)](#)

Additional Parent Resources

Math Tasks, Games, Apps

- Khan Academy - [Fifth Grade](#)
- Illustrative Mathematics - [Grade 5 Tasks](#)
- YouCube - [Mathematical Tasks for Grade 5](#)
- Math App and Games - [YouCube Recommendations](#)

Parent Guides

- [CA PTA Grade 3 - Grade 5 Brochure for Parents/Guardians](#)
These brochures on the mathematics standards showcase example problems and highlight the progression of learning through the grade levels. The brochures also offer suggestions for parents/guardians to support their child's' learning and a list of additional resources
- [CALIFORNIA'S NEW STATE STANDARDS: THE FUTURE BELONGS TO YOUR CHILD](#)
Parents' guide available in multiple languages, by grade level, includes information about state assessments

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- [Jo Boaler, YouCube Parent Resources](#)

Articles, research on growth mindset, how brain learns mathematics, etc...