

Notice, Conjecture, and Generalize Mathematical Properties

The main focus in third grade is developing your child's understanding of multiplication and division and strategies for multiplication and division within 100.

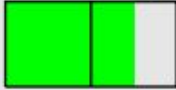
In third grade your child will apply their multiplication skills to more story problems, as well as connect the multiplication facts to one another. For example, if a child knows their "times fours," that can be used to help recall or figure out their "times eights": since $3 \times 4 = 12$, the 3×8 must be twice that or 24. You can encourage this flexibility with different types of multiplication equations by providing word problems regarding you and your child's daily life. For example, you can use a variety of word problems ([Multiplication and Division Situations by Grade Level](#)) when doing math with your child. This will help your child connect the multiplication facts to one another and think algebraically by creating equations and diagram and/or pictures to model the situation.

Your child will see pictures explaining connections between multiplication facts. ([Arrays](#)). Your child will use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, i.e., by using drawings and equations with a symbol for the unknown number to represent the problem. Encourage your child to [analyze word problems](#) and notice [connections between multiplication and division](#) rather than seeing them separately.

Topics such as measurement and geometry will often reinforce the story of multiplication. Picture graphs where each card represents five cards leads to multiplication. Concrete area problems with rectangles also apply multiplication, and can also be used to explain properties of multiplication.


One of the most important skills in math that children learn in third grade is to develop an understanding of fractions as numbers. Encourage your child to place [fractions on the number line](#), and [name fractions](#) using fraction language to describe partitions of shapes into equal shares. In grade three your child will start to develop the idea of a fraction more formally, building on the idea of partitioning a whole into equal parts. The whole can be a shape such as a circle or rectangle, a line segment, etc, that can be subdivided and measured. You can encourage your child to explain why a fraction a/b is equivalent to a fraction $(n \times a) / (n \times b)$ by using visual fraction models. Ask your child how the number and size of parts differ even though the two fractions themselves are the same size. Have them use this principle to recognize and generate equivalent fractions in daily life, such as, cooking, shopping, etc.

The importance of specifying the whole



Without specifying the whole it is not reasonable to ask what fraction is represented by the shaded area. If the left square is the whole, the shaded area represents the fraction $\frac{3}{2}$; if the entire rectangle is the whole, the shaded area represents $\frac{3}{4}$.

Area representations of $\frac{1}{4}$



In each representation the square is the whole. The two squares on the left are divided into four parts that have the same size and shape, and so the same area. In the three squares on the right, the shaded area is $\frac{1}{4}$ of the whole area, even though it is not easily seen as one part in a division of the square into four parts of the same shape and size.

For example, [Explaining Fractions Equivalence with Pictures](#), you can ask your child to represent a fraction and explain what the shaded and not shaded parts represent in the equation and diagram.

Major Work - Multiplication and Division of Whole Numbers and Fractions		
Operations & Algebraic Thinking	Number & Operations, Fractions	Measurement and Data
<ul style="list-style-type: none"> Represent and solve problems involving multiplication and division. Understand properties of multiplication and the relationship between multiplication and division. Multiply and divide within 100. Solve problems involving the four operations, and identify and explain patterns in arithmetic. <p>Multiplication and Division Situations by Grade Level</p>	<p>Grade 3 expectations in this domain are limited to fractions with denominators 2,3,4,6, and 8</p> <ul style="list-style-type: none"> Develop understanding of fractions as numbers. 	<ul style="list-style-type: none"> Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
Required Fluency Expectations		
<p>Single-digit products and quotients (Products from memory by end of Grade 3)</p> <p>Add/subtract within 1000</p>		

For more details see [CA Mathematics Standards, Third Grade, p. 23-27](#)

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

Supporting my Child's Mathematical Growth in Third Grade

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 explain to themselves the meaning of a problem and look for multiple ways to solve the problem. Ask them to check their thinking by asking themselves, “Does this make sense?” and use another method to check their answers.
- Provide opportunities for your child to practice “Mental Math” and share with you how they thought about the problem. (Teaching Channel video: [Third Grade Mental Math](#))
- When having mathematical conversations with your child, help them refine their mathematical communication skills using questions like, “How did you get that?” and “Why do you think that is true?” “Explain how you thought about ___?”.
- Encourage your child to use clear and precise mathematical language in informal and formal math discussions with others and in their own reasoning. ([Math Vocabulary Cards](#))

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
<p>Make sense of problems and persevere in solving them.</p>	<p>In third grade, mathematically proficient students know that doing mathematics involves solving problems and discussing how they solved them. Encourage your child to explain to themselves the meaning of a problem and look for ways to solve it. Have available a variety of concrete objects your child might choose to use. Encourage your child to use objects, pictures, or drawings to help them conceptualize and solve problems: “Jim purchased 5 packages of muffins. Each package contained 3 muffins. How many muffins did Jim purchase?” or “Describe another situation where there would be 5 groups of 3 or 5×3.” a child may check their thinking by asking themselves, “Does this make sense?”</p> <p>Encourage your child to listen to others’ strategies and find connections between various methods for a given problem.</p> <p>Example: (Teaching Channel Video, Grade 3: Persistence in Problem Solving.)</p>
<p>Reason abstractly and quantitatively.</p>	<p>Children recognize that a number represents a specific quantity. They connect the quantity to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities. For example, students apply their understanding of the meaning of the equal sign as “the same as” to interpret an equation with an unknown. When given $4 \times \text{—} = 40$, they might think:</p> <ul style="list-style-type: none"> ● 4 groups of some number is the same as 40. ● 4 times some number is the same as 40. ● I know that 4 groups of 10 is 40, so the unknown number is 10. ● The missing factor is 10, because 4 times 10 equals 40. <p>To reinforce your child’s reasoning and understanding, you might ask, “How do you know?” or “What is the relationship between the quantities?”</p>
<p>Construct viable arguments and</p>	<p>Children may construct arguments using concrete referents, such as objects, pictures, and drawings. They refine their mathematical communication skills as they participate</p>

Supporting my Child’s Mathematical Growth in Third Grade

critique the reasoning of others.	in mathematical discussions with you and others. Encourage your child to verbalize their thinking by asking questions such as “How did you get that?” and “Why is that true?” For example, after investigating patterns on the hundreds chart , a child might explain why the pattern makes sense. (Teaching channel video, Discover number patterns with skip counting)
Model with mathematics.	Children represent problem situations in multiple ways using numbers, words (mathematical language), objects, and math drawings. They might also represent a problem by acting it out or by creating charts, lists, graphs, or equations. For example, a child might use various contexts and a variety of models (e.g., circles, squares, rectangles, fraction bars, and number lines) to represent and develop understanding of fractions. When doing math with your child, provide opportunities for your child to use models to represent both equations and story problems and ask them to explain their thinking. Encourage your child to evaluate their results in the context of the situation and reflect on whether the results make sense. Prompt your child’s thinking with questions such as “What math drawing or diagram could you make and label to represent the problem?” or “What are some ways to represent the quantities?”
Use appropriate tools strategically.	Mathematically proficient children consider the available tools (including drawings or estimation) when solving a mathematical problem and decide when particular tools might be helpful. For instance, a child may use graph paper to find all the possible rectangles that have a given perimeter. They may then compile the possibilities into an organized list or a table and determine whether they have all the possible rectangles. Encourage your child to answer questions (e.g., “Why was it helpful to use blank?”).to answer questions (e.g., “Why was it helpful to use ___?”)
Attend to precision.	Children develop mathematical communication skills as they use clear and precise language in their discussions with others and in their own reasoning. Encourage your child to be careful to specify units of measure and to state the meaning of the symbols they choose. For instance, when calculating the area of a rectangle they record the answer in square units.
Look for and make use of structure.	Children look closely to discover a pattern or structure. For instance, a child might use properties of operations (e.g., commutative and distributive properties) as strategies to multiply and divide. Invite your child to share their thinking by asking them, “What do you notice when ___” or “How do you know if something is a pattern?”
Look for and express regularity in repeated reasoning.	Children notice repetitive actions in computations and look for “Shortcut” methods. For instance, a child may use the distributive property as a strategy to work with products of numbers they know to solve products they do not know. For example, to find the product of 7×8 , a child might decompose 7 into 5 and 2 and then multiply 5×8 and 2×8 to arrive at $40 + 16$, or 56. Encourage your child to continually evaluate their work by asking themselves, “Does this make sense?” , “What is happening in this situation?” or “What predictions or generalizations can this pattern support?”

Table above IUSD adapted from [CA Mathematics Framework, Grade 3](#)

Course Materials

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

Types of Arithmetic Situations

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Grade 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](#)

Glossary: Mathematical Terms, Tables, and Illustrations

- [CA Mathematics Framework Glossary](#)

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 - Third Grade Reading List](#) (organized by topic)
- Marilyn Burns List of [Math Literature \(All ages\)](#)

Standards for Mathematical Practice (SMP) Translations

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

Additional Parent Resources

Math Tasks, Games, Apps

- Khan Academy - [Third Grade](#)
- Illustrative Mathematics - [Grade 3 Tasks](#)
- YouCube - [Mathematical Tasks for Grade 3](#)
- 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
- [Jo Boaler, YouCube Parent Resources](#)
Articles, research on growth mindset, how brain learns mathematics, etc...