

Focus Areas in Grade 4

In Grade 4, instructional time should focus on three critical areas:

1. Developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends;

Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable strategies to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate strategies to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate strategies to estimate and mentally calculate quotients, and interpret remainders based upon the context.

2. Developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers;

Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., $15/9 = 5/3$), and they develop strategies for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

3. Understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

Mathematical Practices in Grade 4

4.MP.1 Make sense of problems and persevere in solving them.	<ul style="list-style-type: none">• In fourth grade, students know that doing mathematics involves solving problems and discussing how they solved them.• Students explain to themselves the meaning of a problem and look for ways to solve it. Fourth graders may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, “Does this make sense?”
--	--

	<ul style="list-style-type: none"> • They listen to the strategies of others and will try different approaches. They often will use another method to check their answers.
4.MP.2 Reason abstractly and quantitatively.	<ul style="list-style-type: none"> • Fourth graders should 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. • They extend this understanding from whole numbers to their work with fractions and decimals. Students write simple expressions, record calculations with numbers, and represent or round numbers using place value concepts.
4.MP.3 Construct viable arguments and critique the reasoning of others.	<ul style="list-style-type: none"> • In fourth grade, students may construct arguments using concrete referents, such as objects, pictures, and drawings. • They explain their thinking and make connections between models and equations. • They refine their mathematical communication skills as they participate in mathematical discussions involving questions like “How did you get that?” and “Why is that true?” • They explain their thinking to others and respond to others’ thinking.
4.MP.4 Model with mathematics	<ul style="list-style-type: none"> • Students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, making a chart, list, or graph, creating equations, etc. • Students need opportunities to connect the different representations and explain the connections. • They should be able to use all of these representations as needed. Fourth graders should evaluate their results in the context of the situation and reflect on whether the results make sense.
4.MP.5 Use appropriate tools strategically	<ul style="list-style-type: none"> • Fourth graders consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use graph paper or a number line to represent and compare decimals and protractors to measure angles. • They use other measurement tools to understand the relative size of units within a system and express measurements given in larger units in terms of smaller units.
4.MP.6 Attend to precision	<ul style="list-style-type: none"> • As fourth graders develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning. • They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, they use appropriate labels when creating a line plot

4.MP.7 Look for and make use of structure	<ul style="list-style-type: none"> • In fourth grade, students look closely to discover a pattern or structure. For instance, students use properties of operations to explain calculations (partial products model). • They relate representations of counting problems such as tree diagrams and arrays to the multiplication principal of counting. • They generate number or shape patterns that follow a given rule.
4.MP.8 Look for and express regularity in repeated reasoning.	<ul style="list-style-type: none"> • Students in fourth grade should notice repetitive actions in computation to make generalizations. • Students use models to explain calculations and understand how algorithms work. • They also use models to examine patterns and generate their own algorithms. For example, students use visual fraction models to write equivalent fractions.

Focus Areas in Grade 5

In Grade 5, instructional time should focus on three critical areas:

1. **Developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions);**

Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)

2. **Extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations;**

Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit addition, subtraction, multiplication, and division. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.

3. Developing understanding of volume;

Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems.

Mathematical Practices in Grade 5

5.MP.1 Make sense of problems and persevere in solving them.	<ul style="list-style-type: none">• Students solve problems by applying their understanding of operations with whole numbers, decimals and fractions including mixed numbers.• They solve problems related to volume and measurement conversions. Students seek the meaning of a problem and look for efficient ways to represent and solve it.• They may check their thinking by asking themselves, “What is the most efficient way to solve the problem?”, “Does this make sense?”, “Can I solve the problem in a different way?”
5.MP.2 Reason abstractly and quantitatively.	<ul style="list-style-type: none">• Fifth graders should recognize that a number represents a specific quantity.• They connect quantities to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities.• They extend this understanding from whole number to their work with fractions and decimals.• Student write simple expressions that record calculations with numbers and represent or round numbers using place value concepts.
5.MP.3 Construct viable arguments and critique the reasoning of others.	<ul style="list-style-type: none">• In fifth grade, students may construct arguments using concrete referents, such as objects, pictures and drawings.• They explain calculations based upon models and 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 like “How did you get that?” and “Why is that true?” They explain their thinking to others and respond to others’ thinking.

<p>5.MP.4 Model with mathematics</p>	<ul style="list-style-type: none"> • Students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, making a chart, list, or graph, creating equations, etc. • Students need opportunities to connect the different representations and explain the connections. • They should be able to use all of these representations as needed. • Fifth graders should evaluate their results in the context of the situation and whether the results make sense. • They also evaluate the utility of models determine which models are most useful and efficient to solve problems.
<p>5.MP.5 Use appropriate tools strategically</p>	<ul style="list-style-type: none"> • Fifth graders consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use unit cubes to fill a rectangular prism and then use a ruler to measure the dimensions • They use graph paper to accurately create graphs and solve problems or make predictions from real world data.
<p>5.MP.6 Attend to precision</p>	<ul style="list-style-type: none"> • Students continue to refine their mathematical communication skills by using clear and precise language in their discussions with others and in their own reasoning. • Students use appropriate terminology when referring to expressions, fractions, geometric figures and coordinate grids. • They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, when figuring out the volume of a rectangular prism they record their answers in cubic units.
<p>5.MP.7 Look for and make use of structure</p>	<ul style="list-style-type: none"> • In fifth grade, students look closely to discover a pattern or structure. For instance, students 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
<p>5.MP.8 Look for and express regularity in repeated reasoning.</p>	<ul style="list-style-type: none"> • Fifth graders use repeated reasoning to understand algorithms and make generalizations about patterns. • Students connect place value and their prior work with operations to understand algorithms to fluently multiply multi-digit numbers and perform all operations with decimals to hundredths. • Students explore operations with fractions with visual models and begin to formulate generalizations.

