



2017-2018

Introduction

Mathematics: Grade 5

In the years prior to grade five, students learned strategies for multiplication and division, developed an understanding of structure of the place value system, and applied understanding of fractions to addition and subtraction with like denominators. Students gained understanding that geometric figures can be analyzed and classified based on their properties. Students learned to fluently add and subtract whole numbers within 1,000,000 using the standard algorithm. In Fifth grade, students extend their work with place value to include decimal numbers to the thousandths place. They use efficient algorithms to multiply multi-digit whole numbers. They begin to divide whole numbers with two-digit divisors. They extend their understanding of whole number operations to adding, subtracting, multiplying, and dividing decimals to hundredths. Fifth graders build on previous experiences with fractions and use a variety of visual models and strategies to add and subtract fractions and mixed numbers with unlike denominators. Students use their understanding of division in context to show answers in the form of fractions. They continue to build conceptual understanding of multiplication of fractions using visual models. Students use visual models and problem solving contexts to develop understanding of dividing a unit fraction by a whole number and a whole number by a fraction.

Critical Areas of Instruction for Fifth Grade

Critical Area 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.)

Critical Area 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.

Critical Area 3: Developing understanding of volume. Students recognize volume as an attribute of three dimensional space.

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.

Please reference the [California Mathematics Framework](#) for elaboration on the standards, critical areas, major and supporting clusters, and instructional practices.



2017-2018

Mathematics: Grade 5

Connecting Standards for Mathematical Practice and Content

The Standards for Mathematical Practice apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations. The standards for Mathematical Practice (MP) represent a picture of what it looks like for students to **do** mathematics, and to the extent possible, content instruction should include attention to appropriate practice standards. There are ample opportunities for students to engage in each practice in fifth grade; the table below offers some general examples of each practice in Grade 5.

Standards for Mathematical Practice	Example:
MP1. <i>Make sense of problems and persevere in solving them.</i>	<p>In grade five, 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. For example, Sonia had $2\frac{1}{3}$ sticks of gum. She promised her brother that she would give him $\frac{1}{2}$ of a stick of gum. How much will she have left after she gives her brother the amount she promised?</p> <p>Teachers can encourage students to check their thinking by asking themselves, “What is the most efficient way to solve the problem?”, “Does this make sense?” and “Can I solve the problem in a different way?”</p>
MP2. <i>Reason abstractly and quantitatively.</i>	<p>Students recognize that a number represents a specific quantity. They connect the quantity to written symbols and create a logical representation of problems, consider appropriate units and the meaning of quantities. They extend this understanding from whole numbers to their work with fractions and decimals. Teachers can support student reasoning by asking questions such as, “What do the numbers in the problem represent?” or “What is the relationship of the quantities?” Students write simple expressions that record calculations with numbers and represent or round numbers using place value concepts. For example, students use abstract and quantitative thinking to recognize that $0.5 \times (300 \div 15)$ is $\frac{1}{2}$ of $(300 \div 15)$ without calculating the quotient.</p>
MP3. <i>Construct viable arguments and critique the reasoning of others.</i>	<p>In fifth grade, students may construct arguments 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 like, “How did you get that?” and “Why is that true?” They explain their thinking to others and respond to others’ thinking.</p> <p>Students use various strategies to solve problems and they defend and justify their work with others. For example, two afterschool clubs are having pizza parties. The teacher will order 3 pizzas for every 5 students in the math club, and 5 pizzas for every 8 students in the student council. If a student is in both groups, decide which party he/she should attend. How much pizza will each student get at each party? If a student wants to attend the party with the most pizza (if divided equally between the students at the party), which party should he/she attend?</p>



2017-2018

Mathematics: Grade 5

Standards for Mathematical Practice	Example:
MP4. <i>Model with mathematics</i>	In grade five, students experiment with representing problem situations in multiple ways using numbers, mathematical language, drawings, pictures, objects, charts, list graphs, and equations. Teachers might ask, “How would it help to create a diagram, chart or table?” or “What are some ways to represent quantities?” Students need opportunities to represent problems in various ways and explain the connections. Fifth graders evaluate their results in the context of the situation and they explain whether results to problems make sense. They evaluate the utility of model they see and draw and can determine which model can be the most useful and efficient to solve problems.
MP5. <i>Use appropriate tools strategically.</i>	Students consider the available tools, including estimation, and decide which tools might be help them solve mathematical problems. For instance, they 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 length of the sides. They use graph paper to accurately create graphs and solve problems or make predictions from real-world data.
MP6. <i>Attend to precision.</i>	Students continue to refine their mathematical communication skills by using clear and precise language in their discussions with others and in their own reasoning. Teachers might ask, “How do you know your solution is reasonable?” Students use appropriate terminology when they refer to expressions, fractions, geometric figures, and coordinate grids. Teachers might ask, “What symbols or mathematical notations are important in this problem?” Students are careful to specify units of measure and state the meaning of symbols they choose. For instance, to determine the volume of a rectangular prism, students record their answers in cubic units.
MP7. <i>Look for and make use of structure.</i>	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. Teachers might ask, “How do you know if something is a pattern?” or “What do you notice when...?”
MP8. <i>Look for and express regularity in repeating reasoning.</i>	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 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?”

Adapted CA Mathematics Framework 2015.



2017-2018

Mathematics: Grade 5

Fifth Grade Content Emphasis by Cluster (PARCC/SBAC)

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice. To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting materials will leave gaps in student skill and understandings and may leave students unprepared for the challenges of a later grade. The following table identifies the Major Clusters, Additional Clusters, and Supporting Clusters for this grade. Also, [Achieve the Core's Coherence Map](#) supports within and across grade level coherence.

Major Clusters (70%) Area of intensive focus where students need fluent understanding and application of the core.	Supporting Clusters (20%) Rethinking and linking areas where some material is being covered, but in a way that applies core understanding.	Additional Clusters (10%) Expose students to other subjects, though at a distinct level of depth and intensity.
<p>Number and Operations in Base Ten</p> <ul style="list-style-type: none"> Understand the place value system. Perform operations with multi-digit whole numbers and with decimals to hundredths. <p>Number and Operations- Fractions</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>Measurement and Data</p> <ul style="list-style-type: none"> Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. 	<p>Measurement and Data</p> <ul style="list-style-type: none"> Represent and interpret data.⁵ Convert like measurement units within a given measurement system.⁶ 	<p>Operations and Algebraic Thinking</p> <ul style="list-style-type: none"> Write and interpret numerical expressions. Analyze patterns and relationships. <p>Geometry</p> <ul style="list-style-type: none"> Graph points on the coordinate plane to solve real-world and mathematical problems. Classify two-dimensional figures into categories based on their properties.

⁵ The standard in this cluster provided an opportunity for solving real-world problems and operations on fractions, connecting directly to both Number and Operations – Fractions clusters.

⁶ Work in these standards support computation with decimals. For example, converting 5 cm to 0.5 m involves computation with decimals to hundredths.

Depth Opportunities: 5.NBT.1, 5.NBT.6; 5.NF.2, 5.NBT.4; 5.MD.5

5th Grade Required Fluency -

- 5.NBT.5 Multi-digit multiplication.



2017-2018

Mathematics: Grade 5

FIFTH GRADE SCOPE AND SEQUENCE ~ YEAR AT A GLANCE				
Quarter	Q1	Q2	Q3	Q4
Big Ideas	Fluency with Whole Numbers	Operations with Decimals	Operations with Fractions	Volume, Algebra & Measurement Conversion
Domains	<ul style="list-style-type: none"> Number & Operations in Base Ten Operations & Algebraic Thinking 	<ul style="list-style-type: none"> Numbers & Operations in Base Ten 	<ul style="list-style-type: none"> Numbers & Operations - Fractions 	<ul style="list-style-type: none"> Measurement & Data Operations & Algebraic Thinking Geometry
Concepts Focus Standards	<u>Place Value, Multiplication and Expression (Ch. 1)</u> 5.OA.1, 5.OA.2, 5.NBT.1, 5.NBT.2*, 5.NBT.5*, 5.NBT.6* <u>Divide Whole Numbers (Ch. 2)</u> 5.NBT.6*	<u>Place Value: Add & Subtract Decimals (Ch. 3)</u> 5.NBT.1, *5.NBT.3a, 5.NBT.3b, 5.NBT.4, 5.NBT.7* <u>Multiply Decimals (Ch. 4)</u> 5.NBT.2*, 5.NBT.7* <u>Divide Decimals (Ch. 5)</u> 5.NBT.2*, 5.NBT.7*	<u>Add and Subtract Fractions with Unlike Denominators & Mixed Numbers (Ch. 6)</u> 5.NF.1*, 5.NF.2* <u>Multiply Fractions (Ch. 7)</u> 5.NF.4a, 5.NF.4b, 5.NF.5a, 5.NF.5b, 5.NF.6 <u>Divide Fractions (Ch. 8)</u> 5.NF.3, 5.NF.7a, 5.NF.7b, 5.NF.7c	<u>Geometry and Volume (Ch. 11)</u> 5.MD.3, 5.MD.3a, 5.MD.3b, 5.MD.4, 5.MD.5a, 5.MD.5b, 5.MD.5c, 5.G.3, 5.G.4 <div style="border: 1px solid black; padding: 2px; display: inline-block;">Connects with: 5.NBT.5*</div> <u>Algebra: Patterns and Graphing (Ch. 9)</u> 5.OA.3, 5.MD.2, 5.G.1, 5.G.2 <div style="border: 1px solid black; padding: 2px; display: inline-block;">5.MD.2 Supports: 5.NF.1* & 5.NF.2*</div> <u>Convert Units of Measurement (Ch. 10)</u> 5.MD.1 <div style="border: 1px solid black; padding: 2px; display: inline-block;">This Supports: 5.NBT.5* & 5.NBT.6*</div> Getting Ready for 6th Grade
Standards Assessed on Interim	All Q1 Standards Listed Above Are Assessed On Interim 1	All Q2 Standards Listed Above Are Assessed On Interim 2 Along with Recursive Standards: 5.NBT.5*, 5.NBT.6*		
Additional HMH Tools & Resources	Found in Quarter 1 Planner	Found in Quarter 2 Planner	Found in Quarter 3 Planner	Found in Quarter 4 Planner
Common Assignment – HMH Performance Task	HMH Performance Task Feature Presentation Chapter 2 – Divide Whole Number (5.NBT.6)	HMH Performance Task Party Planning Critical Area – Fluency with Whole Numbers and Decimals (5.NBT.7, 5.OA.2)	HMH Performance Task Alberto’s Fish Tank Critical Area – Operations with Fractions (5.NF.1, 5.NF.6, 5.NF.7, 5.NF.7c)	HMH Performance Task Water Rush Critical Area – Geometry and Measurement (5.G.1, 5.MD.1)

Key:



Standards in Major Clusters



Standards in Supporting Clusters



Standards in Additional Clusters

* Denotes a recursive standard



Text Boxes provide suggestions for connections to build coherence across standards and further support the major clusters.