# **CRITICAL AREAS**







# 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); (2) extending division to two-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; and (3) developing understanding of volume.

- (1) 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) 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) 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 Practice	Explanation and Examples
	MPs aligned to EL/ELD and NGSS: MP 1, 3, 6
MP.1 Make sense of problems and persevere in solving them.	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 1/3 candy bars. She promised her brother that she would give him ½ of a candy bar. How much will she have left after she gives her brother the amount she promised? Students may 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?"

MP.2 Reason Abstractly and quantitatively	Fifth graders recognize that a number represents a specific quantity. They connect quantities to written symbols and create logical representations of problems, consider appropriate units and the meaning of quantities. They extend this understanding from whole numbers to their work with fractions and decimals. 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 x (300 $\div$ 15) is ½ of (300 $\div$ 15) without calculating the quotient.	
MP.3 Construct viable arguments and critique the reasoning of	In fifth grade students may construct arguments using concrete referents, such as objects, pictures, 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.	
others	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 to attend. How much pizza will each student get at each party? If a student wants to have the most pizza, which party should he/she attend?	
MP.4 Model with mathematics	In grade five, students experiment with representing problem situations in multiple ways such as using numbers, mathematical language, drawings, pictures, objects, charts, lists, graphs and equations. 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 models and can determine which models can be the most useful and efficient to solve problems.	
MP.5 Use appropriate tools strategically	Fifth graders consider available tools, including estimation, and decide which tools might help them solve mathematical problems. For instance, students 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.	
MP.6 Attend to precision	In grade five 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 they refer to expressions, fractions, geometric figures, and coordinate grids. They are careful to specify units of measure and state the meaning of the symbols they choose. For instance, to determine the volume of a rectangular prism, students record their answers in cubic units.	
MP.7 Look for and make use of structure	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.	
MP.8 Look for and express regularity in repeated reasoning	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 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.	

# 2013:

# Operations and Algebraic Thinking, OA

- Write and interpret numerical expressions.
- Analyze patterns and relationships.

#### Number and Operations in Base Ten, NBT

- Understand the place value system.
- Perform operations with multi-digit whole numbers and with decimals to hundredths.

#### Number and Operations—Fractions, NF

- 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.

#### Measurement and Data, MD

- Convert like measurement units within a given measurement system.
- Represent and interpret data.
- Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

#### Geometry, G

- Graph points on the coordinate plane to solve real-world and mathematical problems.
- Classify two-dimensional figures into categories based on their properties.

# Consider using <u>kid lit books</u> as part of math warm ups = a way to talk about shapes/positions (supporting concepts) <u>Maths from Stories</u> and <u>Describe-Draw-Describe (DDD)</u>



# GRADE FIVE BIG IDEAS from 2023 CA MATH FRAMEWORK chapter 6





The graphic illustrates the connections and relationships of some fifth-grade mathematics concepts. Direct connections include the following:

- · Factors & Groups directly connects to: Powers & Place Values, Layers of Cubes, Modeling, Seeing Division
- · Shapes on a Plane directly connects to: Telling a Data Story, Modeling, Plotting Patterns
- Powers & Place Value directly connects to: Layers of Cubes, Fraction Connections, Modeling, Factors &
  Groups
- · Layers of Cubes directly connects to: Powers & Place Value, Factors & Groups, Modeling, Seeing Division
- · Telling a Data Story directly connects to: Shapes on a Plane, Modeling, Plotting Patterns
- · Seeing Division directly connects to: Layers of Cubes, Modeling, Factors & Groups
- Plotting Patterns directly connects to: Telling a Data Story, Modeling, Fraction Connections, Shapes on a

Plane

• Fraction Connections directly connects to: Powers & Place Value, Modeling, Plotting Patterns

Modeling directly connects to: Plotting Patterns, Factors & Groups, Shapes on a Plane, Powers & Place Value,

Fraction Connections, Layers of Cubes, Telling a Data Story, Seeing Division.

# **CONTENT CONNECTIONS ~ BIG IDEAS ~ CONTENT STANDARDS**

CC1~reasoning with data CC2~exploring changing quantities CC3~taking wholes apart, putting parts together CC4~discovering shape and space

Content Connections	Big Ideas	Grade Five Content Standards
Reasoning with Data	Plotting Patterns	<b>G.1, G.2, OA.3, MD.2, NF.7:</b> Students generate and analyze patterns, plotting them on a line plot or coordinate plane, and use their graph to tell a story about the data. Some situations should include fraction and decimal measurements, such as a plant growing.
Reasoning with Data and	Telling a Data Story	<b>G.1, G.2, OA.3:</b> Understand a situation, graph the data to show patterns and relationships, and to help communicate the meaning of a real-world event.
Exploring Changing Quantities		
and		
Discovering Shape & Space		



Content Connections	Big Ideas	Grade Five Content Standards
Exploring Changing Quantities	Factors and Groups	<b>OA.1, OA.2, MD.4, MD.5</b> : Students use grouping symbols to express changing quantities and understand that a factor can represent the number of groups of the quantity.
Exploring Changing Quantities	Modeling	NBT.3, NBT.5, NBT.7, NF.1, NF.2, NF.3, NF.4, NF.5, NF.6, NF.7, MD.4, MD.5, OA.3: Set up a model and use whole, fraction, and decimal numbers and operations to solve a problem. Use concrete models and drawings and justify results.
Exploring Changing Quantities and Taking Wholes Apart, Putting Parts Together	Fraction connections	NF.1, NF.2, NF.3, NF.4, NF.5, NF.7, MD.2, NBT.3: Make and understand visual models, to show the effect of operations on fractions. Construct line plots from real data that include fractions of units.
Taking Wholes Apart, Putting Parts Together	Seeing Division	MD.3, MD.4, MD.5, NBT.4, NBT.6, NBT.7: Solve real problems that involve volume, area, and division, setting up models and creating visual representations. Some problems should include decimal numbers. Use rounding and estimation to check accuracy and justify results.
Taking Wholes Apart, Putting Parts Together	Powers and Place Value	NBT.3, NBT.2, NBT.1, OA.1, OA.2: Use whole-number exponents to represent powers of 10. Use expanded notation to write decimal numbers to the thousandths place and connect decimal notation to fractional representations, where the denominator can be expressed in powers of 10.
Discovering Shape and Space	Layers of Cubes	MD.5, MD.4, MD.3, OA.1, MD.1: Students recognize volume as an attribute of three-dimensional space. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for 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.
Discovering Shape & Space and Exploring Changing Quantities	Shapes on a Plane	<b>G.1, G.2, G.3, G4, OA.3, NF.4, NF.5, NF.6:</b> Graph 2-D shapes on a coordinate plane, notice and wonder about the properties of shapes, parallel and perpendicular lines, right angles, and equal length sides. Use tables to organize the coordinates of the vertices of the figures and study the changing quantities of the coordinates.

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Drivers of Investigation. Unifying reasons that both elicit curiosity and provide

the motivation for deeply engaging with authentic mathematics.

D1~make sense of the world (understand and explain)

D2~predict what could happen (predict)

D3~impact the future (affect)

