CRITICAL AREAS

In grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

(1) Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.

(2) Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.

(3) Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same-size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.

(4) Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

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 third grade, mathematically proficient 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. Third grade students may use concrete objects, pictures, or drawings to help them conceptualize and solve problems, such as “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 x 3.” Students may check their thinking by asking themselves, “Does this make sense?” Students listen to other students’ strategies and are able to make connections between various methods for a given problem.

MP.2 Reason Abstractly and quantitatively	Third grade students 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 x ? = 40, they might think: ● 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 times10 equals 40.
MP.3 Construct viable arguments and critique the reasoning of others	In third grade students may construct arguments using concrete referents, such as objects, pictures, and drawings. They refine their mathematical communication skills as they participate in mathematical discussions that the teacher facilities by asking questions such as “How did you get that?” and “Why is that true?” Students explain their thinking to others and respond to others’ thinking. For example, after investigating patterns on the 100s chart, students might explain why the pattern makes sense addend | addend | sum 0 | 20 | 20 1 | 19 | 20 2 | 18 | 20 3 | 17 | 20 4 | 16 | 20 • | • | • • | • | • • | • | • 20 | 0 | 20
MP.4 Model with mathematics	Third grade students represent problem situations in multiple ways using numbers, words (mathematical language), drawing pictures, and objects. They might also represent a problem by acting it out or by creating charts, lists, graphs, or equations. For example, students use various contexts (e.g., marbles, animals or fruit) and a variety of models (e.g., circles, squares, rectangles, fraction bars, and number lines) to represent and develop understanding of fractions. Students use models to represent both equations and story problems and can explain their thinking. They evaluate their results in the context of the situation and reflect on whether the results make sense.
MP.5 Use appropriate tools strategically	In third grade, mathematically proficient students 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 to find all the possible rectangles that have a given perimeter. They compile the possibilities into an organized list or a table and determine whether they have all the possible rectangles.
MP.6 Attend to precision	In third grade students develop mathematical communication skills as they use clear and precise language in their discussions with others and in their own reasoning. They are 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.
MP.7 Look for and make use of structure	In third grade students look closely to discover a pattern or structure. For instance, students use properties of operations (e.g., commutative and distributive properties) as strategies to multiply and divide.
MP.8 Look for and express regularity in repeated reasoning	In third grade students notice repetitive actions in computations and they look for “shortcut” methods. For instance, students may use the distributive property as a strategy to work with products of numbers they do know to solve products they do not know. For example, to find the product of 7 x 8, students might decompose 7 into 5 and 2 and then multiply 5 x 8 and 2 x 8 to arrive at 40 + 16 or 56. Third grade students continually evaluate their work by asking themselves, “Does this make sense?”

2013:

Operations and Algebraic Thinking, OA

- 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.

Number and Operations in Base Ten, NBT

- Use place value understanding and properties of operations to perform multi-digit arithmetic.

Number and Operations—Fractions, NF

- Develop understanding of fractions as numbers.

Measurement and Data, MD

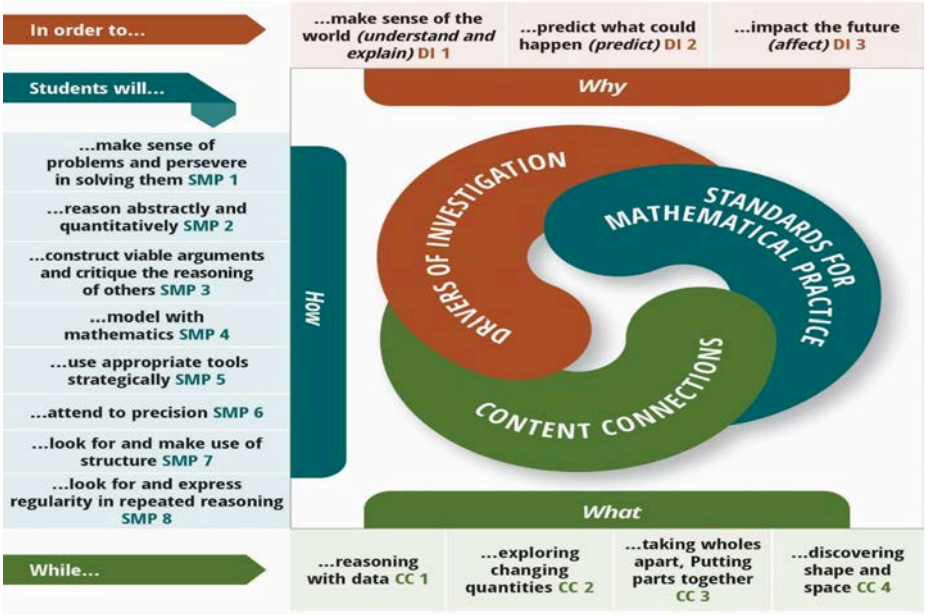
- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- Represent and interpret data.
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

Geometry, G

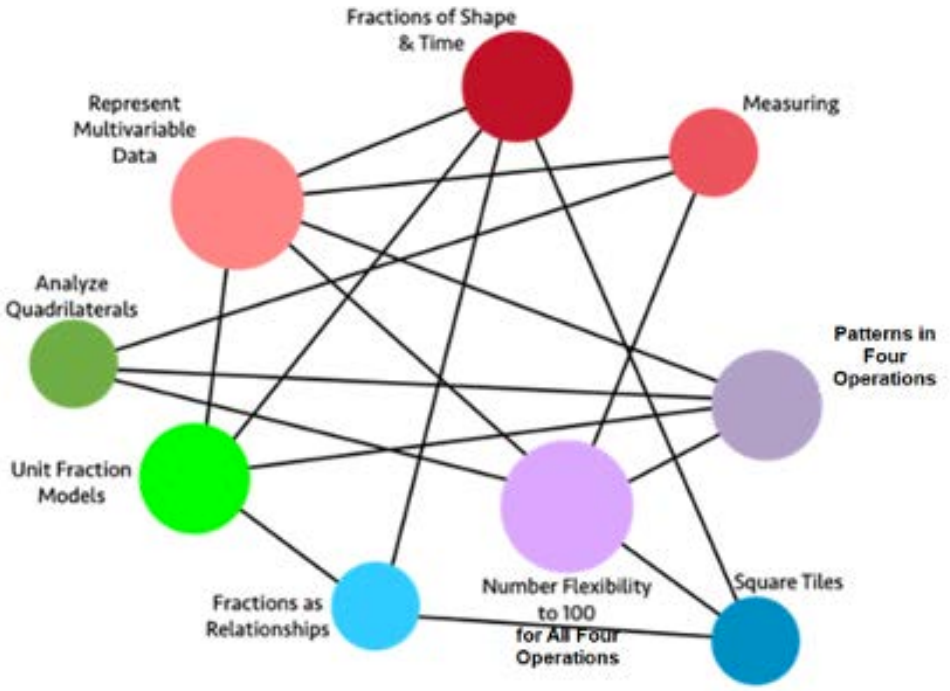
- Reason with shapes and their attributes.

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

2023:



GRADE THREE BIG IDEAS from 2023 CA MATH FRAMEWORK chapter 6



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

· Fractions of Shape & Time directly connects to: Square Tiles, Fractions as Relationships, Unit Fractions Models, Represent Multivariable Data

· Measuring directly connects to: Number Flexibility to 100 for All Four Operations, Analyze Quadrilaterals, Represent Multivariable Data

· Patterns in Four Operations directly connects to: Number Flexibility to 100 for All Four Operations, Unit Fraction Models, Analyze Quadrilaterals, Represent Multivariable Data

· Square Tiles directly connects to: Fractions as Relationships, Number Flexibility to 100 for All Four Operations, Fractions of Shape & Time

· Fractions as Relationships directly connects to: Square Tiles, Fractions of Shape & Time, Unit Fraction Models

· Unit Fraction Models directly connects to: Fractions as Relationships, Patterns in Four Operations, Fractions of Shape & Time, Represent Multivariable Data

· Analyze Quadrilaterals directly connects to: Number Flexibility to 100 for All Four Operations, Patterns in Four Operations, Measuring

· Represent Multivariable Data directly connects to: Unit Fraction Models, Number Flexibility to 100 for All Four Operations, Patterns in Four Operations, Measuring, Fractions of Shape & Time

Number Flexibility to 100 for All Four Operations directly connects to: Square Tiles, Analyze Quadrilaterals, Represent Multivariable Data, Measuring, Patterns in Four Operations.

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 Three Content Standards
Reasoning with Data	**Represent Multivariable Data**	**MD.3, MD.4, MD.1, MD.2, NBT.1:** Collect data and organize data sets, including measurement data; read and create bar graphs and pictographs to scale. Consider data sets that include three or more categories (multivariable data) for example, when I interact with my puppy, I either call her name, pet her, or give her a treat.
Reasoning with Data and Taking Wholes Apart, Putting Parts Together and Discovering Shape and Space	**Fractions of Shape and Time**	**MD.1, NF.1, NF.2, NF.3, G.2:** Collect data by time of day, show time using a data visualization. Think about fractions of time and of shape and space, expressing the base unit as a unit fraction of the whole.
Reasoning with Data	**Measuring**	**MD.2, MD.4, NBT.1:** Measure volume and mass, incorporating linear measures to draw and represent objects in two-dimensional space. Compare the measured objects, using line plots to display measurement data. Use rounding where appropriate.
Exploring Changing Quantities	**Patterns in Four Operations**	**NBT.2, OA.8, OA.9, MD.1:** Add and subtract within 1000 - Using student generated strategies and models, such as base 10 blocks. e.g., use expanded notation to illustrate place value and justify results. Investigate patterns in addition and multiplication tables, and use operations and color coding to generalize and justify findings.
[illegible]	[illegible]	[illegible]

Content Connections	Big Ideas	Grade Three Content Standards
Exploring Changing Quantities	**Number Flexibility to 100 for All Four Operations**	**OA.1, OA,2, OA.3, OA.4, OA.5, OA.6, OA.7, OA.8, NBT.3, MD.7, NBT.1:** Multiply and divide within 100 and justify answers using arrays and student generated visual representations. Encourage number sense and number flexibility - not "blind" memorization of number facts. Use estimation and rounding in number problems.
Taking Wholes Apart, Putting Parts Together	**Square Tiles**	**MD.5, MD.6, MD.7, OA.7, NF.1:** Use square tiles to measure the area of shapes, finding an area of n squared units, and learn that one square represents 1/nth of the total area.
Taking Wholes Apart, Putting Parts Together	**Fractions as Relationships**	**NF.1, NF.3:** Know that a fraction is a relationship between numerators and denominators – and it is important to consider the relationship in context. Understand why 1/2=2/4=3/6.
Taking Wholes Apart, Putting Parts Together and Discovering Shape and Space	**Unit Fraction Models**	**NF.2, NF.3, MD.1:** Compare unit fractions using different visual models including linear models (e.g., number lines, tape measures, time, and clocks) and area models (e.g., shape diagrams encourage student justification with visual models).
Discovering Shape and Space	**Analyze Quadrilaterals**	**MD.8, G.1, G.2, NBT.1, OA.8:** Describe, analyze, and compare quadrilaterals. Explore the ways that area and perimeter change as side lengths change, by modeling real world problems. Use rounding strategies to approximate lengths where appropriate.

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)