



# 3<sup>rd</sup> Grade Math





## Third Grade Mathematics Teaching & Learning Framework

Quarter 1		Quarter 2	Quarter 3	Quarter 4		
Unit 1 4 weeks	Unit 2 5 weeks	Unit 3 9 weeks	Unit 4 9 weeks	Unit 5 2 weeks	Unit 6 2 weeks	Unit 7 5 weeks
<b>Numbers and Operations in Base Ten</b>	<b>The Relationship Between Multiplication and Division</b>	<b>Patterns in Addition and Multiplication</b>	<b>Representing and Comparing Fractions</b>	<b>Geometry</b>	<b>Measureme nt</b>	<b>Review, Mastery and Extend</b>
<b>MGSE3.NBT.1</b> (Round to the nearest 10 or 100) <b>MGSE3.NBT.2</b> (Add and subtract within 1000) <b>MGSE3.OA.8</b> (Solve 2 step word problems with addition and subtraction)	<b>MGSE3.OA.1</b> (Interpret multiplication) <b>MGSE3.OA.2</b> (Interpret division) <b>MGSE3.OA.3</b> (Solve word problems with multiplication/division) <b>MGSE3.OA.4</b> (Unknown number in multiplication/division) <b>MGSE3.OA.5</b> (Commutative and Associative properties) <b>MGSE3.OA.6</b> (Understand division) <b>MGSE3.OA.7</b> (multiply and divide within 100)	<b>MGSE3.OA.3</b> (Solve word problems with multiplication/division) <b>MGSE3.OA.5</b> (Distributive properties) <b>MGSE3.OA.7</b> (multiply and divide within 100) <b>MGSE3.OA.8</b> (Solve 2 step word problems) <b>MGSE3.OA.9</b> (Patterns with addition and multiplication) <b>MGSE3.MD.5</b> (Understand concepts of area) <b>MGSE3.MD.6</b> (Measure area by counting units) <b>MGSE3.MD.7</b> (Relate area to multiplication and addition) <b>MGSE3.NBT.3</b> (Multiply 1 digit numbers by multiples of 10) <b>MGSE3.MD.3</b> (Scaled picture and bar graph)	<b>MGSE3.MD.8</b> (Perimeter of polygons) <b>MGSE3.G.2</b> (Partition of shapes) <b>MGSE3.NF.1</b> (Unit fractions) <b>MGSE3.NF.2</b> (Fractions on a number line) <b>MGSE3.NF.3</b> (Fractions-equivalence and compare) <b>MGSE3.MD.4</b> (Line plot with fractions) <b>MGSE3.MD.1</b> (Time to the nearest minute) <b>MGSE3.OA.8</b> (Solve 2 step word problems)	<b>MGSE3.G.1</b> (Reason about shapes) <b>MGSE3.G.2</b> (Partition of shapes)	<b>MGSE3.MD.1</b> (Elapsed time) <b>MGSE3.MD.2</b> (Liquid volume and mass)	Review all standards based on student needs. <b>Mastery:</b> <b>MGSE3.NBT.2</b> (add and subtract within 1000) <b>MGSE3.OA.7</b> (know from memory all products of single digit factors)  <b>Extend:</b> <b>MGSE4.NBT.2</b> (Read, write and compare) <b>MGSE4.NBT.3</b> (Rounding) <b>MGSE4.NBT.4</b> (Add and subtract/algorithm) <b>MGSE4.MD.2</b> (Word problems-only time)

These units were written to build upon concepts from prior units, so later units contain tasks that depend upon the concepts and standards addressed in earlier units.

All units include the Mathematical Practices and indicate skills to maintain.

**NOTE:** Mathematical standards are interwoven and should be addressed throughout the year in as many different units and tasks as possible in order to stress the natural connections that exist among mathematical topics.



**Grades 3-5 Key:** MGSE= Mathematics Georgia Standards of Excellence G= Geometry, MD=Measurement and Data, NBT= Number and Operations in Base Ten, NF = Number and Operations, Fractions, OA = Operations and Algebraic Thinking.

## Standards for Mathematical Practice

*Mathematical Practices are listed with each grade's mathematical content standards to reflect the need to connect the mathematical practices to mathematical content in instruction.*

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council’s report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy).

***Students are expected to:***

**1. Make sense of problems and persevere in solving them.**

In third 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. Third 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?” They listen to the strategies of others and will try different approaches. They often will use another method to check their answers.

**2. Reason abstractly and quantitatively.**

Third 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.

**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 involving questions like “How did you get that?” and “Why is that true?” They explain their thinking to others and respond to others’ thinking.

## Standards for Mathematical Practice continued

### **4. Model with mathematics.**

Students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, acting out, 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. Third graders should evaluate their results in the context of the situation and reflect on whether the results make sense.

### **5. Use appropriate tools strategically.**

Third 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 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.

### **6. Attend to precision.**

As third 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, when figuring out the area of a rectangle they record their answers in square units.

### **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 as strategies to multiply and divide (commutative and distributive properties).

### **8. Look for and express regularity in repeated reasoning.**

Students in third grade should notice repetitive actions in computation and look for more shortcut methods. For example, students may use the distributive property as a strategy for using products they know to solve products that they don’t know. For example, if students



are asked to find the product of  $7 \times 8$ , they might decompose 7 into 5 and 2 and then multiply  $5 \times 8$  and  $2 \times 8$  to arrive at  $40 + 16$  or 56. In addition, third graders continually evaluate their work by asking themselves, “Does this make sense?”

## Operations and Algebraic Thinking (3.OA)

### **Represent and solve problems involving multiplication and division.**

**MGSE3.OA.1** Interpret products of whole numbers, e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as  $5 \times 7$ .

**MGSE3.OA.2** Interpret whole number quotients of whole numbers, e.g., interpret  $56 \div 8$  as the number of objects in each share when 56 objects are partitioned equally into 8 shares (How many in each group?), or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each (How many groups can you make?). For example, describe a context in which a number of shares or a number of groups can be expressed as  $56 \div 8$ .

**MGSE3.OA.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, ‡ e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

**MGSE3.OA.4** Determine the unknown whole number in a multiplication or division equation relating three whole numbers using the inverse relationship of multiplication and division. For example, determine the unknown number that makes the equation true in each of the equations,  $8 \times ? = 48$ ,  $5 = \square \div 3$ ,  $6 \times 6 = ?$

### **Understand properties of multiplication and the relationship between multiplication and division.**

**MGSE3.OA.5** Apply properties of operations as strategies to multiply and divide. Examples: If  $6 \times 4 = 24$  is known, then  $4 \times 6 = 24$  is also known. (Commutative property of multiplication.)  $3 \times 5 \times 2$  can be found by  $3 \times 5 = 15$ , then  $15 \times 2 = 30$ , or by  $5 \times 2 = 10$ , then  $3 \times 10 = 30$ . (Associative property of multiplication.) Knowing that  $8 \times 5 = 40$  and  $8 \times 2 = 16$ , one can find  $8 \times 7$  as  $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$ . (Distributive property.)



**MGSE3.OA.6** Understand division as an unknown-factor problem. For example, find  $32 \div 8$  by finding the number that makes 32 when multiplied by 8.

### **Multiply and divide within 100**

**MGSE3.OA.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that  $8 \times 5 = 40$ , one knows  $40 \div 5 = 8$ ) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

### **Solve problems involving the four operations, and identify and explain patterns in arithmetic.**

**MGSE3.OA.8** Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

**MGSE3.OA.9** Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.‡ For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

## **Number and Operations in Base Ten (3.NBT)**

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

**MGSE3.NBT.1** Use place value understanding to round whole numbers to the nearest 10 or 100.

**MGSE3.NBT.2** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

**MGSE3.NBT.3** Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g.,  $9 \times 80$ ,  $5 \times 60$ ) using strategies based on place value and properties of operations.



## Numbers and Operations-Fractions (3.NF)

Grade 3 expectations in this domain are limited to fractions with denominators of 2, 3, 4, 6, and 8.

### Develop understanding of fractions as numbers.

**MGSE3.NF.1** Understand a fraction  $\frac{1}{b}$  as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction);

understand a fraction  $\frac{a}{b}$  as the quantity formed by a parts of size  $\frac{1}{b}$ . *For example,  $\frac{3}{4}$  means there are three  $\frac{1}{4}$  parts, so  $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ .*

**MGSE3.NF.2** Understand a fraction as a number on the number line; represent fractions on a number line diagram.

a. Represent a fraction  $\frac{1}{b}$  on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into equal

parts. Recognize that each part has size  $\frac{1}{b}$ . Recognize that a unit fraction  $\frac{1}{b}$  is located  $\frac{1}{b}$  whole unit from 0 on the number line.

b. Represent a non-unit fraction  $\frac{a}{b}$  on a number line diagram by marking off a lengths of  $\frac{1}{b}$  (unit fractions) from 0. Recognize that the

resulting interval has size  $\frac{a}{b}$  and that its endpoint locates the non-unit fraction  $\frac{a}{b}$  on the number line.

**MGSE3.NF.3** Explain equivalence of fractions through reasoning with visual fraction models. Compare fractions by reasoning about their size.

a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.



- b. Recognize and generate simple equivalent fractions with denominators of 2, 3, 4, 6, and 8, e.g.,  $\frac{1}{2} = \frac{2}{4}$ ,  $\frac{4}{6} = \frac{2}{3}$ . Explain why the fractions are equivalent, e.g., by using a visual fraction model.
- c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples:* Express 3 in the form  $3 = \frac{6}{2}$  (3 wholes is equal to six halves); recognize that  $\frac{3}{1} = 3$ ; locate  $\frac{4}{4}$  and 1 at the same point of a number line diagram.

### **Develop understanding of fractions as numbers (continued)**

- d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols  $>$ ,  $=$ , or  $<$ , and justify the conclusions, e.g., by using a visual fraction model.

## **Measurement and Data (3.MD)**

### **Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.**

**MGSE3.MD.1** Tell and write time to the nearest minute and measure elapsed time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram, drawing a pictorial representation on a clock face, etc.

**MGSE3.MD.2** Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

### **Represent and interpret data.**



**MGSE3.MD.3** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*

**MGSE3.MD.4** Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units - whole numbers, halves, or quarters.

**Geometric Measurement: understand concepts of area and relate area to multiplication and to addition.**

**MGSE3.MD.5** Recognize area as an attribute of plane figures and understand concepts of area measurement.

- a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.
- b. A plane figure which can be covered without gaps or overlaps by  $n$  unit squares is said to have an area of  $n$  square units.

**MGSE3.MD.6** Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

**MGSE3.MD.7** Relate area to the operations of multiplication and addition.

- a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
- b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
- c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths  $a$  and  $b + c$  is the sum of  $a \times b$  and  $a \times c$ . Use area models to represent the distributive property in mathematical reasoning.

**Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.**

**MGSE3.MD.8** Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.



## Geometry (3.G)

### **Reason with shapes and their attributes.**

**MGSE3.G.1** Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

**MGSE3.G.2** Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*