1st Grade Mathematics Teaching & Learning Framework

Semester 1			Semester 2		
Unit 1 7 weeks	**Unit 2** 7 weeks	**Unit 3** 4 weeks	**Unit 4** 8 weeks	**Unit 5** 8 weeks	**Unit 6** 2 weeks
Extending Number Sequence Understanding to Build, Compare and Interpret Numbers Within 120 **1.NR.1** **1.MDR.6**	**Building and Explaining the Relationship Between Addition and Subtraction** **1.NR.2**	**Sorting, Sifting, Shifting Shapes and Patterns** **1.PAR.3** **1.GSR.4** **1.MDR.6**	**Exploring Meaningful Measurements** **1.MDR.6** **1.NR.2**	**Problem Solving to Answer Real-Life Questions** **1.NR.1,2,5** **1.MDR.6**	**Culminating Capstone Unit**
1.NR.1.1 (Count within 120) **1.NR.1.2** (Two-digits represents tens and ones) **1.NR.1.3** (Compare numbers) **1.MDR.6.4** (Analyze graphical displays)	**1.NR.2.4** (Add subtract within 10 fluently) **1.NR.2.5** (Meaning of equal sign) **1.NR.2.6** (Determine the unknown) **1.NR.2.2** (Add subtract within 20 using strategies/strings) **1.NR.2.3** (Add subtract within 20 using inverse relationship) **1.NR.2.1** (Add subtract within 20) **1.NR.2.7** (Word problem situations within 20) ***1.NR.1*** *(Count forward and backward within 120)*	**1.PAR.3.1** (Repeating patterns) **1.PAR.3.2** (Growing, shrinking, repeating patterns) **1.GSR.4.1** (Identify 2-D/3-D shapes, sort and classify) **1.GSR.4.2** (Compose shapes) **1.GSR.4.3** (Partitioning) **1.MDR.6.4** (Analyze graphical displays)	**1.MDR.6.1** (Determining length and ordering objects) **1.MDR.6.2** (Time and elapsed time to the hour) **1.MDR.6.3** (Value of coins) **1.MDR.6.4** (Analyze graphical displays) **1.NR.2.4** (Add subtract within 10 fluently) ***1.NR.1*** *(Place Value)* ***1.NR.2*** *(Solve addition & subtraction within 20)*	**1.NR.5.1** (Add subtract one- and two-digit whole numbers within 100) **1.NR.5.2** (Mentally find 10 more or 10 less) **1.NR.5.3** (Add/subtract multiples of 10) **1.MDR.6.4** (Analyze graphical displays) **1.NR.2.4** (Add subtract within 10 fluently) ***1.MDR.6*** *(Estimate, measure, & record lengths)* ***1.NR.1*** *(Compare numbers up to 100)* ***1.NR.2*** *(Word problem situations within 20)* ***1.GSR.4*** *(Partitioning)* ***1.PAR.3*** *(Patterns)*	**All standards.**

Units contain tasks that depend upon the concepts addressed in earlier units. 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.

The Framework for Statistical Reasoning, Mathematical Modeling Framework, and the K-12 Mathematical Practices should be taught throughout the units.

Key for Course Standards: NR: Numerical Reasoning, PAR: Patterning & Algebraic Reasoning, GSR: Geometric & Spatial Reasoning, MDR: Measurement & Data Reasoning

GEORGIA'S K-12 MATHEMATICS STANDARDS 2021

Governor Kemp and Superintendent Woods are committed to the best set of academic standards for Georgia's students – laying a strong foundation of the fundamentals, ensuring age- and developmentally appropriate concepts and content, providing instructional supports to set our teachers up for success, protecting and affirming local control and flexibility regarding the use of mathematical strategies and methods, and preparing students for life. These Georgia-owned and Georgia-grown standards leverage the insight, expertise, experience, and efforts of thousands of Georgians to deliver the very best educational experience for Georgia's 1.7 million students.

In August 2019, Governor Brian Kemp and State School Superintendent Richard Woods announced the review and revision of Georgia's K-12 mathematics standards. Georgians have been engaged throughout the standards review and revision process through public surveys and working groups. In addition to educator working groups, surveys, and the Academic Review Committee, Governor Kemp announced a new way for Georgians to provide input on the standards: the Citizens Review Committee, a group composed of students, parents, business and community leaders, and concerned citizens from across the state. Together, these efforts were undertaken to ensure Georgians will have buy-in and faith in the process and product.

The Citizens Review Committee provided a charge and recommendations to the working groups of educators who came together to craft the standards, ensuring the result would be usable and friendly for parents and students in addition to educators. More than 14,000 Georgians participated in the state's public survey from July through September 2019, providing additional feedback for educators to review. The process of writing the standards involved more than 200 mathematics educators -- from beginning to veteran teachers, representing rural, suburban, and metro areas of our state.

Grade-level teams of mathematics teachers engaged in deep discussions; analyzed stakeholder feedback; reviewed every single standard, concept, and skill; and provided draft recommendations. To support fellow mathematics teachers, they also developed learning progressions to show when key concepts were introduced and how they progressed across grade levels, provided examples, and defined age/developmentally appropriate expectations.

These teachers reinforced that strategies and methods for solving mathematical problems are classroom decisions -- not state decisions -- and should be made with the best interest of the individual child in mind. These recommended revisions have been shared with the Academic Review Committee, which is composed of postsecondary partners, age/development experts, and business leaders, as well as the Citizens Review Committee, for final input and feedback.

Based on the recommendation of Superintendent Woods, the State Board of Education will vote to post the draft K-12 mathematics standards for public comment. Following public comment, the standards will be recommended for adoption, followed by a year of teacher training and professional learning prior to implementation.

Use of Mathematical Strategies and Methods & Affirming Local Control

These standards preserve and affirm local control and flexibility regarding the use of the "standard algorithm" and other mathematical strategies and methods. Students have the right to use any strategy that produces accurate computations, makes sense, and is appropriate for their level of understanding.

Therefore, the wording of these standards allows for the "standard algorithm" as well as other cognitive strategies deemed developmentally appropriate for each grade level. Revised state tests will not measure the students' use of specific mathematical strategies and methods, only whether students understand the key mathematical skills and concepts in these standards.

Teachers are afforded the flexibility to support the individual needs of their students. It is critical that teachers and parents remain partners to help each child grow to become a mathematically literate citizen.

Georgia's K-12 Mathematics Standards - 2021
Mathematics Big Ideas and Learning Progressions, K-5

Mathematics Big Ideas, K-5

K	1	2	3	4	5
MATHEMATICAL PRACTICES & MODELING					
DATA & STATISTICAL REASONING					
NUMERICAL REASONING (NR)					
PATTERNING & ALGEBRAIC REASONING (PAR)					
GEOMETRIC & SPATIAL REASONING (GSR)					
MEASUREMENT & DATA REASONING (MDR)					

K-5 MATHEMATICS: LEARNING PROGRESSIONS

Key Concepts	K	1	2	3	4	5
NUMERICAL REASONING						
Numbers (whole numbers, fractions, and decimal numbers)	• Whole numbers to 100	• Whole numbers to 120 • Partition shapes into halves and quarters/fourths (fourths) with no shading	• Whole numbers to 1000 • Partition shapes into halves, thirds and quarters (fourths) with no shading	• Whole numbers to 10,000 • Unit fractions with denominators of 2, 3, 4, 6, and 8 • Represent fractions • Equivalence of simple fractions • Introduce shading to identify and compare fractional parts	• Whole numbers to 100,000 • Non-unit fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 100 • Fractions with like denominators • Decimal fractions (tenths and hundredths)	• Multi-digit whole numbers • Fractions with unlike denominators • Fractions greater than 1 • Decimal fractions to thousandths
Counting	• Counting forward to 100 • Counting backward from 20 • Counting objects to 20	• Counting forward and backward within 120 • Skip counting by 2s, 5s, and 10s • Counting objects to 120	• Counting forward and backward within 1000 • Skip counting by 2s, 5s, 10s, 25s, and 100s • Counting objects to 1000	• Counting unit fractions	• Counting non-unit fractions	• Counting decimal numbers
Place Value	• Compose and decompose numbers within 20 • Identify and write numerals to 20	• Compose and decompose 2-digit numbers	• Hundreds, tens and ones in 3-digit numbers	• Round numbers to 1000 to nearest 10 or 100 • Read & write multi-digit whole numbers to thousands	• Magnitude of place value • Multi-digit whole numbers to 100,000 • Round multi-digit whole numbers • Fractions with • denominators of 10 or 100	• Magnitude of place value extended to decimal numbers • Powers of 10 to 10^3 • Read & write decimal numbers to thousandths place • Round decimal numbers to hundredths place
Comparisons	• Comparing objects up to 10 • Comparing numbers of objects in a set from 1-10	• Comparing numbers to 100	• Comparing numbers to 1,000	• Comparing numbers to 10,000 • Unit fractions	• Multi-digit numbers • Fractions less than 1 • Decimal fractions to hundredths place	• Decimal fractions to thousandths place • Fractions greater than 1
Computational Fluency	• Fluency with addition and subtraction within 5	• Fluency with addition and subtraction within 10	• Fluency using mental math up to 20 • Fluency with strategies within 100	• Fluency with multiplication and division with single-digit numbers • Fluency with addition and subtraction within 1,000	• Fluency with addition and subtraction with multi-digit whole numbers	• Fluency with multiplication and division with multi-digit whole numbers
Addition & Subtraction	• Single-digit numbers within 10	• Within 20 (using properties of operations) • Within 100 (using base ten understanding)	• Within 1,000 (using tools and strategies)	• Within 10,000	• Within 100,000 • Fractions with like denominators	• Fractions with unlike denominators • Decimal fractions to the hundredths place
Multiplication & Division			• Building arrays	• Within 100 • Multiply by multiples of 10	• Factors and multiples • Prime and composite numbers • Multiply by multi-digit whole numbers • Divide by 1-digit divisors	• Multiply multi-digit whole numbers • Multiply fractions and whole numbers • Divide unit fractions and whole numbers • Reason about multiplying by a fraction >, <, or = 1
Expressions						• Simple numerical expressions involving whole numbers with or without grouping symbols • Express fractions as division problems

K-5 MATHEMATICS: LEARNING PROGRESSIONS

Key Concepts	K	1	2	3	4	5
PATTERNING & ALGEBRAIC REASONING						
Patterns	• Repeating patterns with numbers and shapes • Explain the rationale for the pattern.	• Growing and repeating patterns of 1s, 5s, and 10s • Repeated operations, shapes or numbers	• Numerical patterns involving addition and subtraction	• Numerical patterns related to multiplication • Make predictions based on patterns	• Generate number and shape patterns that follow a rule • Represent and describe patterns	• Generate two numerical patterns using a given rule • Identify relationships using a table
Graphing						• Plot order pairs in first quadrant
GEOMETRIC & SPATIAL REASONING						
Shapes and Properties	• Identify, sort, classify, analyze, and compare 2D & 3D based on attributes using informal language • Positional words	• Identify, sort, and classify 2D & 3D shapes based on specific attributes using formal language and geometric properties • Compose 2D shapes & 3D shapes	• Describe, compare and sort 2-D and 3-D shapes given a set of attributes • Identify lines of symmetry in everyday objects	• Quadrilaterals • Parallel & perpendicular line segments, points, lines, line segments, & right angles and presence or absence of these in quadrilaterals • Lines of symmetry with quadrilaterals	• Points, lines, line segments, rays, angles, and parallel & perpendicular line segments • Classify, compare, & contrast polygons based on presence or absence of parallel or perpendicular line segments, angles of a specified size or side lengths.	• Classify polygons based on geometric properties • Relationships between categories and subcategories of shapes
Geometric Measurement				• Area of rectangles • Perimeter of rectangles	• Area and perimeter of composite rectangles • Angle measurement	• Volume of right rectangular prisms
MEASUREMENT & DATA REASONING						
Measurement & Data	• Measurable attributes of length, height, width and weight • Classify and sort up to 10 objects by attributes • Display and interpret categorical data with up to 10 data points on graphs	• Measure length in non-standard units • Compare, describe and order up to 3 objects using length in non-standard units • Display and interpret categorical data (with up to 3 categories)	• Measure length to nearest whole unit • Use tools such as constructed rulers and standard rulers • Choose units (in, ft, yd) appropriately • Display and interpret categorical data (with up to 4 categories)	• Measure liquid volume, length and mass in customary units • Use rulers to measure lengths in halves and fourths of an inch • Analyze numerical and categorical data with whole number values	• Measure liquid volume, distance, and mass using the metric measurement system • Use rulers to measure lengths to nearest $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$ of an inch • Analyze data using dot plots (with values to the nearest 1/8 of a unit)	• Measure length and weight in metric units • Convert between units of measurement • Create and analyze dot plots (line plots) with fraction measurements
Money	• Identify pennies, nickels and dimes and know the value of each coin	• Identify value of pennies, nickels, dimes and quarters	• Combination of coins • Problems involving dollars and all coins	• Using money to solve problems	• Using money as a tool or manipulative to solve problems	• Using money as a tool to solve problems involving decimals
Time		• Tell & write time in hours and half hours • Measure elapsed time to the hour	• Time to the nearest five minutes • Distinguish between a.m. & p.m. • Elapsed time to hour or half hour	• Tell time to the nearest minute • Estimate relative time • Elapsed time to hour, half hour & quarter hour	• Intervals of time • Elapsed time to the nearest minute	• Solving problems involving time

1st Grade

The seven standards listed below are the key content competencies students will be expected to master in first grade. Additional clarity and details are provided through the classroom-level learning objectives and evidence of student learning details for each grade-level standard found on subsequent pages of this document. As teachers are planning instruction and assessing mastery of the content at the grade level, the focus should remain on the key competencies listed in the table below.

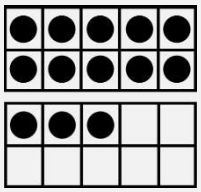
FIRST GRADE STANDARDS
1.MP: **Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals.**
1.NR.1: **Extend the count sequence to 120. Read, write, and represent numerical values to 120 and compare numerical values to 100.**
1.NR.2: **Explain the relationship between addition and subtraction and apply the properties of operations to solve real-life addition and subtraction problems within 20.**
1.PAR.3**: Identify, describe, extend, and create repeating patterns, growing patterns, and shrinking patterns found in real-life situations.**
1.GSR.4: **Compose shapes, analyze the attributes of shapes, and relate their parts to the whole.**
1.NR.5: **Use concrete models, the base ten structure, and properties of operations to add and subtract within 100.**
1.MDR.6: **Use appropriate tools to measure, order, and compare intervals of length and time, as well as denominations of money to solve real-life, mathematical problems and analyze graphical displays of data to answer relevant questions.**

Georgia's K-12 Mathematics Standards - 2021

1st Grade

<table>
<tr><td colspan="5">NUMERICAL REASONING – counting, numbers, equality, place value, addition, subtraction</td></tr>
<tr><td colspan="5">1.NR.1: Extend the count sequence to 120. Read, write, and represent numerical values to 120 and compare numerical values to 100.</td></tr>
<tr><td colspan="2">Expectations</td><td colspan="3">Evidence of Student Learning
(not all inclusive; see Grade Level Overview for more details)</td></tr>
<tr><td>1.NR.1.1</td><td>Count within 120, forward and backward, starting at any number. In this range, read and write numerals and represent a number of objects with a written numeral.</td><td>Fundamentals
Students should understand that as the counting sequence increases, the value of each number increases by one or ten. As the counting sequence decreases, the value of each number decreases by one or ten.</td><td>Strategies and Methods
Students should count forwards and backwards by 1s and 10s from any number within 120.
Students should have opportunities to explore the counting sequences using a variety of tools. These tools can include, but are not limited to 99 charts, hundred charts, number paths, number lines (predetermined and open), etc.</td><td>Terminology
Number Path – a counting model where each rectangle can be counted
1 2 3 4 5 6 7 8 9
Number Line – a length model where each number is represented by its length from zero
0 1 2 3 4 5 6 7 8 9 10 11</td></tr>
<tr><td>1.NR.1.2</td><td>Explain that the two digits of a 2-digit number represent the amounts of tens and ones.</td><td colspan="2">Fundamentals
Students should be able to recognize the relationship of a digit to its place indicates the number of groups represented in that place. For example: In the number 33, the digit "3" in the tens place has a value that is equivalent to three groups of ten. Students interpret the value of each digit. The number 33 has three tens and three remaining ones. They should also see this as equivalent to 33 ones.
Students should understand the following as special cases:
10 can be thought of as a bundle of ten ones — called a "ten."-Bundles could include groups of pennies, bundles of straws, or other hands-on manipulatives.
The numbers from 11 to 19 are composed or decomposed as a ten and one, two, three, four, five, six, seven, eight, or nine ones.</td><td>Strategies and Methods
The numbers 11 to 19 can be represented on ten frames, double ten frames, rekenreks, and with pennies and dimes, etc.
The numbers 10, 20, 30, 40, 50, 60, 70, 80, and 90, can be represented using a variety of tools (popsicle sticks, linking cubes, straws, etc.)</td><td>Age/Developmentally Appropriate
Students should be able to explain that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).</td></tr>
<tr><td>1.NR.1.3</td><td>Compare and order whole numbers up to 100 using concrete models, drawings, and the symbols >, =, and <.</td><td>Fundamentals
Students should understand whole numbers to 100 based on meanings of the tens and ones and record the results of comparisons with the symbols >, =, and <.</td><td>Strategies and Methods
Representations should include the use of physical materials such as number paths, base-ten materials, number lines (predetermined and open), dimes and pennies, etc.</td><td>Age/Developmentally Appropriate
Students should have ample experiences communicating their comparisons using words, representations AND relevant applications before using only symbols in the learning objective.
Students need practice justifying comparisons with words and models, prior to exposure and use of the comparison symbols.</td></tr>
</table>

1.NR.2: Explain the relationship between addition and subtraction and apply the properties of operations to solve real-life addition and subtraction problems within 20.

<table>
<tr><th colspan="2">Expectations</th><th colspan="5">Evidence of Student Learning
(not all inclusive; see Grade Level Overview for more details)</th></tr>
<tr><td>1.NR.2.1</td><td>Use a variety of strategies to solve addition and subtraction problems within 20.</td><td colspan="5">Fundamentals
Students should be able to solve problems with two or more addends.
Decomposition should include, but not be limited to tens and ones.
Strategies and Methods – <u>see special note in appendix</u>
Students should be able to solve problems involving addition and subtraction using a variety of advanced counting and part-whole strategies related to everyday life.
Problems can include word problems that are meaningful to a student's real environment. It is important for the problems presented to be relevant and interesting for the learners to pique their natural, intellectual curiosity.
Terminology
First grade students should be given opportunities to use mental reasoning to solve problems with a variety of problem types within 20. <u>Click here for a listing of all problem types.</u>
Example
I have scored 13 points. How many more points do I need to make 20 points?  </td></tr>
<tr><td>1.NR.2.2</td><td>Use pictures, drawings, and equations to develop strategies for addition and subtraction within 20 by exploring strings of related problems.</td><td colspan="2">Fundamentals
Students should be able to relate counting to addition and subtraction by counting all, counting on, and counting back when making sense of practical, mathematical addition and subtraction problems within 20.
Students should be given opportunities to use mental reasoning to solve problems involving number strings within 20. <u>Click here for a listing of all problem types.</u>
Students should also solve problem situations with an unknown in all positions.
Students should be given multiple opportunities to apply strategies developed through number strings to solve practical, mathematical problems.
Terminology
Number strings are sets of related problems crafted to support students to construct big ideas about mathematics and build their own strategies (Fosnot & Dolk, 2002).
8 + 2
8 + 2 + 4
8 + 6
8 + 5</td><td colspan="2">Strategies and Methods – <u>see special note in appendix</u>
Symbols can be used to represent unknown amounts in equations.
Students should be provided with learning experiences to develop strategies such as:
Advanced Counting; Counting On
Making Ten
Decomposing a number leading to a ten
Using the relationship between addition and subtraction within 20 (knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (6 + 7 is the same as 6 + 6 + 1 = 12 + 1 = 13).
Counting All 5 + 2 = ☐. The student counts five counters. The student adds two more. The student counts 1, 2, 3, 4, 5, 6, 7 to get the answer.
Counting Back 12 – 3 = ☐. The student counts twelve counters. The</td><td>Age/Developmentally Appropriate
Students should not be encouraged to use key/clue words because they will not work with subsequent problem types.
The unknown quantity should be represented in all positions.</td></tr>
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				student removes a counter and says 11, removes another counter and says 10, and removes a third counter and says 9. The student knows the answer is 9 since they counted back 3.	
1.NR.2.3	Recognize the inverse relationship between subtraction and addition within 20 and use this inverse relationship to solve authentic problems.	***Age/Developmentally Appropriate*** ● Problems should be within 20.	***Fundamentals*** ● Students should understand subtraction as an unknown-addend problem. ● Students are not expected to know nor use the term inverse.	***Terminology*** ● The terms below are used to clarify expectations for the teaching professional. Students are not required to use this terminology when engaging with the learning objective. ○ Addend – a number that is added to another number in an addition expression or equation. For example, in the expression 5 + 8, 5 and 8 are both addends. ○ An inverse relationship shows the relationship between addition and subtraction where addition can be used to find the quantity of a set after some in the set are removed. For example, 3+2 = 5 is related to 5 - 3 = 2 because of the inverse relationship.	***Examples*** ● There are 14 birds in the tree. 8 of them flew away. How many birds are left in the tree? The student thinks of 14 – 8 = ☐ as 8 + ☐ = 14 ● Jenny had 10 pencils and gave some to Eric. Jenny now has 8 pencils. How many pencils did she give to Eric? The student thinks of 10 - ☐ = 8 as ☐ + 8 = 10
1.NR.2.4	Fluently add and subtract within 10 using a variety of strategies.	***Terminology*** ● Fluently/Fluency – To achieve fluency, students should be able to choose flexibly among methods and strategies to solve mathematical problems accurately and efficiently. ● Accuracy includes attending to precision. ● Efficiency includes using well-understood strategy with ease. ● Flexibility involves using strategies such as making 5 or making 10. ● For appropriate strategies and methods, *see special note in appendix*.			***Age/Developmentally Appropriate*** ● Fluency does not lend itself to timed tests or speed.
1.NR.2.5	Use the meaning of the equal sign to determine whether equations involving addition and subtraction are true or false.	***Fundamentals*** ● Students should explore and explain the relationship of the equal sign to quantities and orally justify if equations involving addition and subtraction are "true" (equal) or "false" (not equal).			***Example*** ● Which of the following equations are true and which are false? How do you know? ○ 6 = 6 (True/Correct Statement) ○ 7 = 8 – 1 (True/Correct Statement) ○ 5 + 2 = 2 + 5 (True/Correct Statement) ○ 4 + 1 = 5 + 2 (False/Incorrect Statement)
1.NR.2.6	Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers.	***Strategies and Methods*** ● Symbols can be used to represent unknown amounts in equations.			***Example*** ● Determine the unknown number that makes the equation true in each of the equations: 8 + ? = 10, 5 = ☐ – 3, 3 + 4 = Δ. These are some possible ways to record equations that indicate an unknown number.
1.NR.2.7	Apply properties of operations as strategies to solve addition and	***Fundamentals*** ● Students should solve problem situations with an	***Terminology*** ● The terminology below is used to clarify expectations	***Age/Developmentally Appropriate*** ● Students should **not** be encouraged to	***Strategies and Methods*** – *see special note in appendix* ● When students use strategies such as make a	***Examples*** ● Example 1: Students may engage mentally using flexibility with the

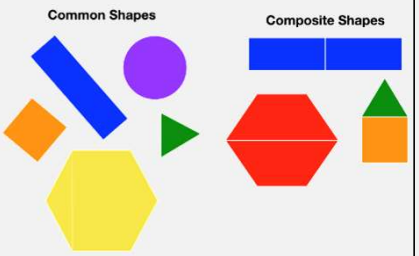
	subtraction problem situations within 20.	unknown in all positions. Click here for a listing of all problem types.	for the teaching professional. Students are not required to use this terminology when engaging with the learning objective. ● Addend – any number that is added to another number in an addition expression or equation. For example, in the expression 7 + 3, 7 and 3 are addends.	use key/clue words because they will not work with subsequent problem types. ● The unknown quantity should be represented in all positions. ● Students at this grade level are **not** expected to know the names or identify the specific properties.	ten and decompose numbers, they are using properties such as the associative property and commutative property. ● Students should be given multiple opportunities to use objects, drawings, and equations to solve problems involving addition and subtraction. ● Students should develop strategies involving the properties of operations by comparing problem solving strategies. ● Symbols can be used to represent unknown amounts in equations.	order of the addends: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known (The Commutative Property of Addition is applied in this example). ● Example 2: Students may engage mentally using flexibility with the grouping of numbers: To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12 (The Associative Property of Addition is applied in this example).

PATTERNING & ALGEBRAIC REASONING *– repeating patterns, growing, patterns, and shrinking patterns*

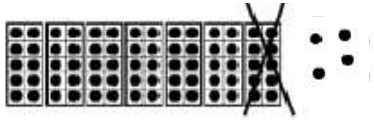
1.PAR.3: Identify, describe, extend, and create repeating patterns, growing patterns, and shrinking patterns found in real-life situations.

Expectations		Evidence of Student Learning **(not all inclusive; see Grade Level Overview for more details)**	
1.PAR.3.1	Investigate, create, and make predictions about repeating patterns with a core of up to 3 elements resulting from repeating an operation, as a series of shapes, or a number string.	***Fundamentals*** ● Students should investigate repeating patterns to make predictions.	***Example*** ● Number String: ○ 1, 2, 3, 1, 2, 3, 1, 2, … ● Series of shapes: ○  ● Operation: ○ 2, 4, 6, 8, … (add 2 each time)
1.PAR.3.2	Identify, describe, and create growing, shrinking, and repeating patterns based on the repeated addition or subtraction of 1s, 2s, 5s, and 10s.	***Strategies and Methods*** ● Students should use a number line and a hundred chart. ● Students should investigate patterns found in authentic situations.	

GEOMETRIC & SPATIAL REASONING *– shapes, attributes, partitions of circles and rectangles*					
1.GSR.4: Compose shapes, analyze the attributes of shapes, and relate their parts to the whole.					
Expectations		**Evidence of Student Learning** **(not all inclusive; see Grade Level Overview for more details)**			
1.GSR.4.1	Identify common two-dimensional shapes and three-dimensional figures, sort and classify them by their attributes and build and draw shapes that possess defining attributes.	***Terminology*** ● The terms below are used to clarify expectations for the teaching professional. Students are not required to use this terminology when engaging with the learning objective. ○ Attributes – characteristics of two-dimensional shapes and three-dimensional figures, including geometric properties. ○ Defining attributes – include number of sides, faces, vertices (corners), and angles. ○ Non-defining attributes – include size, orientation, texture, and color.	***Fundamentals*** ● Students should identify these two-dimensional shapes based on attributes: ○ half circle ○ quarter circles ○ circles ○ triangles ○ squares ○ rectangles (Students should know that a square is a type of rectangle, based on its attributes.) ○ hexagons ● Students should identify these three-dimensional shapes based on attributes: ○ cubes ○ cones ○ cylinders ○ spheres ○ rectangular prisms ● Students should distinguish between defining attributes of two-dimensional shapes and three-dimensional figures versus non-defining attributes (e.g., triangles are closed and three-sided, a defining attribute versus triangles are red, non-defining attribute). ● Students should be able to build and draw shapes based on defining attributes. Two dimensional shapes should be limited to triangles, squares, rectangles. ● Students should be able to identify a shape's attributes, regardless of its orientation (i.e., flipped) or position (i.e., turned).	***Age/Developmentally Appropriate*** ● Students should be encouraged to sort and classify shapes based on their choice of attributes as well as attributes that may be provided. ● Students at this grade level are **not** expected to know the names of or identify specific geometric properties.
1.GSR.4.2	Compose two-dimensional shapes (rectangles, squares, triangles, half-circles, and quarter-circles) and three-dimensional figures (cubes, rectangular prisms, cones, and cylinders) to create a shape formed of two or more common shapes and compose	***Age/Developmentally Appropriate*** ● Students do not need to learn formal names, such as, "right rectangular prism".	***Fundamentals*** ● It is important to note that the size of the shape does not necessarily distinguish between common and composite. ● Students should use these two-dimensional shapes to create composite shapes: ○ circles	***Terminology*** ● Shapes that are made up of two or more common shapes are called composite shapes.	***Example***  *(Students may compose a pentagon using a triangle and square as above.)*

	new shapes from the composite shape.		○ half-circles ○ quarter-circles ○ triangles ○ squares ○ rectangles (Students should know that a square is a type of rectangle based on its attributes.) ○ hexagons ● Students should use these three-dimensional shapes to create composite shapes: ○ cubes ○ cones ○ cylinders ○ spheres ○ rectangular prisms	 ● Students will be working with shapes to compose and decompose shapes to form new shapes. ○ Compose – put together ○ Decompose – break apart	
1.GSR.4.3	Partition circles and rectangles into two and four equal shares.	***Age/Developmentally Appropriate*** ● Shading of the shares is not needed for this learning objective because the student is only required to partition the whole shape into equal shares. ● Students are not expected to write the fraction using fraction notation in first grade.		***Fundamentals*** ● Students should explore and justify reasoning about the relationship of parts to the whole. ● Students should describe the shares using the words "halves," "fourths or quarters." ● Students should describe the whole as "two of" or "four of" the shares. ● Students should reason that partitioning a shape into more equal shares creates smaller shares.	

NUMERICAL REASONING *– base ten structure, addition and subtraction within 100*					
1.NR.5: Use concrete models, the base ten structure, and properties of operations to add and subtract within 100.					
Expectations		**Evidence of Student Learning** **(not all inclusive; see Grade Level Overview for more details)**			
1.NR.5.1	Use a variety of strategies to solve applicable, mathematical addition and subtraction problems with	***Fundamentals*** ● Problems can include word problems that are meaningful to a student's real environment. It is important for the applicable, mathematical problems presented to be relevant and interesting	***Terminology*** ● The terms below are used to clarify expectations for the teaching professional.	***Strategies and Methods*** – *see special note in appendix* ● Students should use concrete models, drawings, estimation, and strategies based on	***Age/Developmentally Appropriate*** ● The properties of operation that should be explored in this objective are

	one- and two-digit whole numbers.	for the learners to pique their natural, intellectual curiosity. ● Students should be able to interpret and manipulate concrete mathematical models. ● Students should be given opportunities to justify their solutions to meet this learning objective. ● Students should use estimation as a strategy to find numbers that are close to the numbers they are using to add and subtract. ● Students should be able to use numerical reasoning to add and subtract within 100. ● The numerical reasoning developed should include an understanding of the base-ten structure and properties of operations. ● Students should reason that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to put together (compose) or break apart (decompose) a ten.	Students are not required to use this terminology when engaging with the learning objective. ○ Compose – put together numbers ○ Decompose – break apart numbers ○ Estimate – find a value that is close	place value, properties of operations, and/or the relationship between addition and subtraction to explain their reasoning. ● Strategies may include reasoning involving making a ten, doubles and near-doubles, think addition, and using benchmark numbers. ● Examples of different strategies and representations can be found within the *Computational Strategies for Whole Numbers* document found in the appendices.	the commutative and associative properties. ● Students are not expected to identify properties.
1.NR.5.2	Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	***Age/Developmentally Appropriate*** ● This expectation requires students to apply this mental strategy and become fluent through purposeful practice. The goal is automaticity built on a deep understanding of the patterns of tens within our base-ten system.	***Example*** ● There were 74 birds in the park. 10 of the birds flew away. How many birds are in the park, now? I pictured 7 ten-frames and 4 left over in my head. Since 10 birds flew away, I took one of the ten-frames away. That left 6 ten-frames and 4 left over. So, there are 64 birds left in the park. 		
1.NR.5.3	Add and subtract multiples of 10 within 100.	***Strategies and Methods*** – *see special note in appendix* ● Students should use concrete models; drawings, and strategies based on place value, properties of operations, and or/the relationship between addition and subtraction to explain their reasoning. ● Students should describe sums and differences, using concrete models (tools and manipulatives), drawings, and strategies based on place value, properties of operations and/or the relationship between addition and subtraction to explain (verbally and/or written) the reasoning used.	***Age/Developmentally Appropriate*** ● By the end of first grade, students should be able to state and write their justifications showing the relationship between their solution path and their reasoning. The focus of this standard is on thought processes, not merely on computational accuracy.		

MEASUREMENT & DATA REASONING *– length, time, money*

1.MDR.6: Use appropriate tools to measure, order, and compare intervals of length and time, as well as denominations of money to solve real-life, mathematical problems and answer relevant questions.

Expectations

Evidence of Student Learning

(not all inclusive; see Grade Level Overview for more details)

1.MDR.6.1

Estimate, measure, and record lengths of objects using non-standard units, and compare and order up to three objects using the recorded measurements. Describe the objects compared.

Age/Developmentally Appropriate

- Students should learn through exploration that the length measurement of an object is the number of same-sized length units that span it with no gaps or overlaps (iteration). For example, when students are measuring the height of a vegetable plant in their classroom garden, they may use snap cubes put together to determine how tall the plant is.

Terminology

- Length measurement of an object is the number of same-sized length units that span an object with no gaps or overlaps (iteration).
- *Iteration* –the process of repeating a unit length end to end along an object to obtain a measurement.

Fundamentals

- Students should explore this concept with objects found in the real world to develop solid measurement reasoning.
- Students should explore this concept with objects.
- Students should express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end, by using non-standard units.

Strategies and Methods

- Students should use terminology such as, but not limited to, "longer than", "shorter than", "same length as", "taller than", and "equal to".
- Appropriate tools to measure non-standard units can be items such as one-inch paper clips, one-inch tiles, centimeter cubes, etc. The units need to correspond to standard units of measurement.

Example

- Students at an elementary school are maintaining an aquaponics garden. To measure the heights of the plants growing in their garden, they use snap cubes to determine how many cubes high the plant have grown.

1.MDR.6.2

Tell and write time in hours and half-hours using analog and digital clocks, and measure elapsed time to the hour on the hour using a predetermined number line.

Age/Developmentally Appropriate

- Students should tell and write time to the hour and half hour in everyday settings, paying attention to a.m. and p.m.
- Problems presented to students should avoid crossing over a.m. and p.m.
- Students are not required to know the term elapsed time at this grade level.

Strategies and Methods

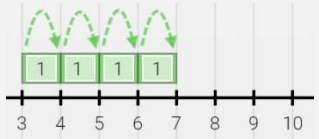
- Begin with a one-handed clock (just the hour hand) and use a lot of approximate language such as:
  - "It's close to 10:00."
  - "It's half-way between 11:00 and 12:00."
  - "It's just a little after 1:00."
- Video showing how to use a number line to tell time and how the number line can be curved to look like a circular clock – Click Here.

Fundamentals

- The familiarity of the number line provides students with an opportunity to make sense of the concept of elapsed time. The connection to the traditional clock can be made by bending the clock number line into a circle.

Examples

- At 3:00 PM we are going to the trampoline park. We will be there for 4 hours. What time will we be leaving the trampoline park? Represent this on a number line.



It will be 7:00 when we leave the trampoline park.

1.MDR.6.3	Identify the value of quarters and compare the values of pennies, nickels, dimes, and quarters.	***Fundamentals*** ● Students explored the values of pennies, nickels, and dimes in Kindergarten.	***Strategies and Methods*** ● Learning experiences should be provided to help students understand that size does not always equal value.	***Example*** ● "A set of three dimes has a greater value than one quarter," or "five nickels is equal in value to one quarter".
1.MDR.6.4	Ask questions and answer them based on gathered information, observations, and appropriate graphical displays to compare and order whole numbers.	***Strategies and Methods*** ● Questions should be student generated. ● Students should have the opportunity to use concrete models, drawings, and the symbols >, <, and = when exploring comparisons.	***Fundamentals*** ● Relevant problems can include word problems that are meaningful to a student's real environment. It is important for the problems presented to be relevant and interesting for the learners to pique their natural, intellectual curiosity.	

ESSENTIAL INSTRUCTIONAL GUIDANCE

MATHEMATICAL PRACTICES

The Mathematical Practices describe the reasoning behaviors students should develop as they build an understanding of mathematics – the "habits of mind" that help students become mathematical thinkers. There are eight standards, which apply to all grade levels and conceptual categories.

These mathematical practices describe how students should engage with the mathematics content for their grade level. Developing these habits of mind builds students' capacity to become mathematical thinkers. These practices can be applied individually or together in mathematics lessons, and no particular order is required. In well-designed lessons, there are often two or more Mathematical Practices present.

MATHEMATICAL PRACTICES	
MP: Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals.	
Code	**Expectation**
MP.1	Make sense of problems and persevere in solving them.
MP.2	Reason abstractly and quantitatively.
MP.3	Construct viable arguments and critique the reasoning of others.
MP.4	Model with mathematics.
MP.5	Use appropriate tools strategically.
MP.6	Attend to precision.
MP.7	Look for and make use of structure.
MP.8	Look for and express regularity in repeated reasoning.

MATHEMATICAL MODELING

Teaching students to model with mathematics is engaging, builds confidence and competence, and gives students the opportunity to collaborate and make sense of the world around them, the main reason for doing mathematics. For these reasons, mathematical modeling should be incorporated at every level of a student's education. This is important not only to develop a deep understanding of mathematics itself, but more importantly to give students the tools they need to make sense of the world around them. Students who engage in mathematical modeling will not only be prepared for their chosen career but will also learn to make informed daily life decisions based on data and the models they create.

The diagram below is a mathematical modeling framework depicting a cycle of how students can engage in mathematical modeling when solving a realistic problem or task.

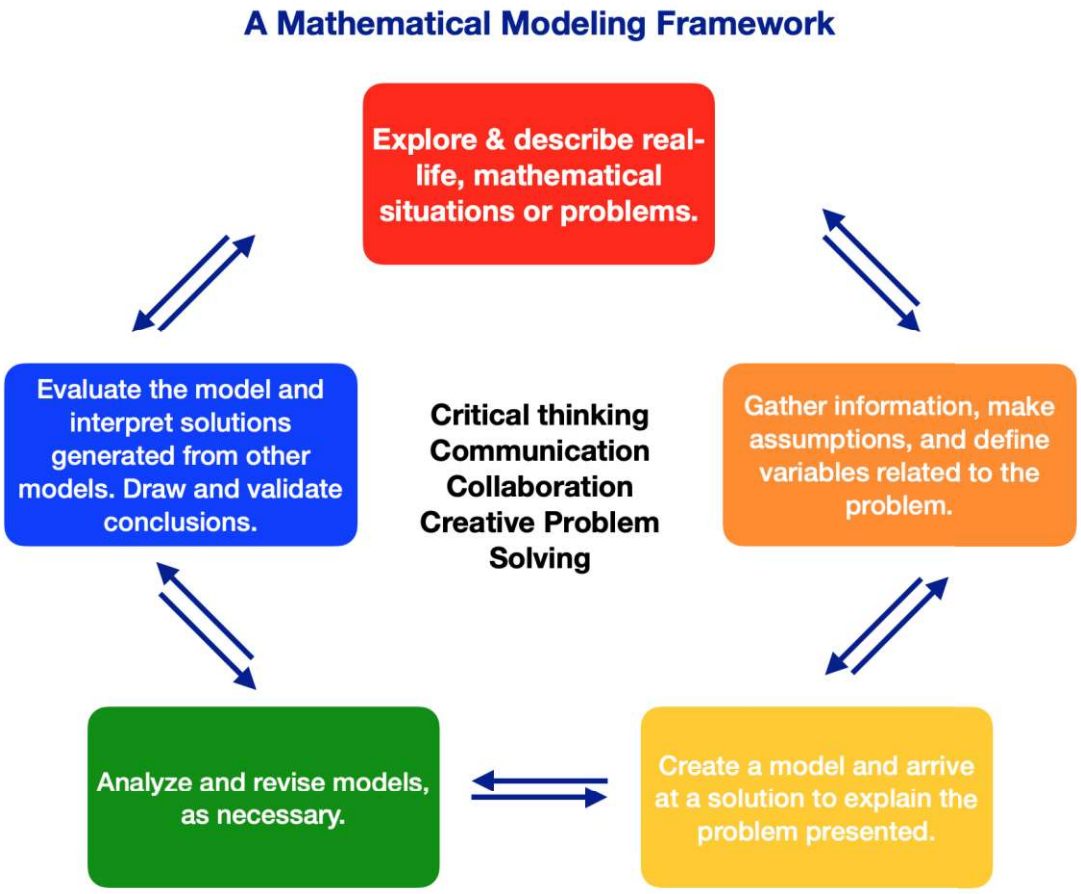


Image adapted from: Suh, Matson, Seshaiyer, 2017

FRAMEWORK FOR STATISTICAL REASONING

Statistical reasoning is important for learners to engage as citizens and professionals in a world that continues to change and evolve. Humans are naturally curious beings and statistics is a language that can be used to better answer questions about personal choices and/or make sense of naturally occurring phenomena. Statistics is a way to ask questions, explore, and make sense of the world around us.

The Framework for Statistical Reasoning should be used in all grade levels and courses to guide learners through the sense-making process, ultimately leading to the goal of statistical literacy in all grade levels and courses. Reasoning with statistics provides a context that necessitates the learning and application of a variety of mathematical concepts.

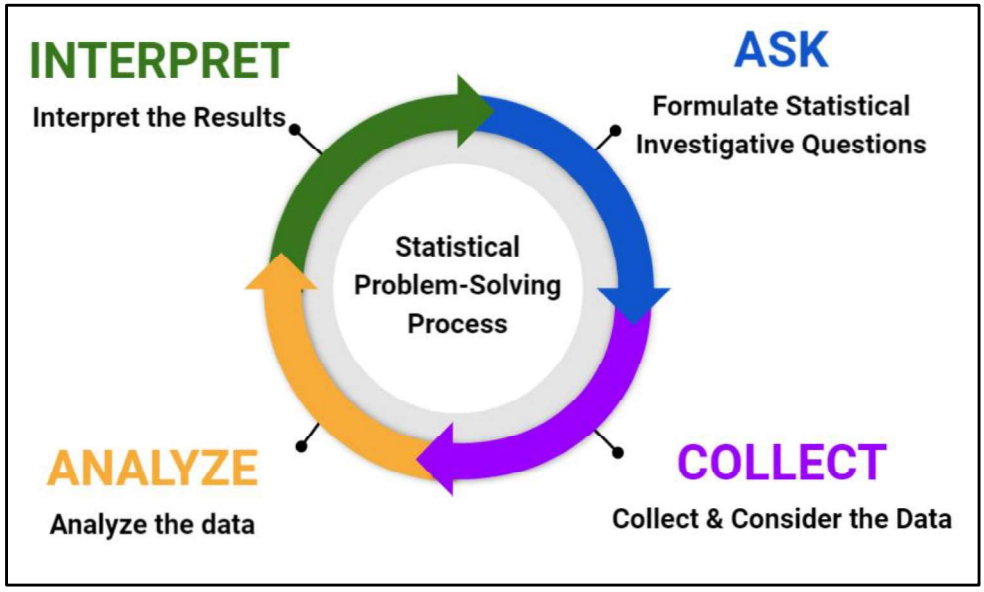


FIGURE 1: GEORGIA FRAMEWORK FOR STATISTICAL REASONING

The following four-step statistical problem-solving process can be used throughout each grade level and course to help learners develop a solid foundation in statistical reasoning and literacy:

I. Formulate Statistical Investigative Questions
Ask questions that anticipate variability.

II. Collect & Consider the Data
Ensure that data collection designs acknowledge variability.

III. Analyze the Data
Make sense of data and communicate what the data mean using pictures (graphs) and words. Give an accounting of variability, as appropriate.

IV. Interpret the Results
Answer statistical investigative questions based on the collected data.

Kindergarten: Create statistical investigative questions that can be answered by collecting, analyzing, and interpreting data with **up to 10 data points.**

Ask	Collect	Analyze	Interpret
Generate and ask questions to investigate situations within the classroom.	**Collect data to answer a statistical investigative question.**	**Represent the findings from generated questions using objects and pictures.**	**Explain the findings based on the data collected and represented on graphs.**

Instructional Supports

- Expectations in this grade level should be taught throughout the year and applied contextually to the current expectation and everyday events.
- Relevant problems can include word problems that are meaningful to a student's real environment. It is important for the problems presented to be relevant and interesting for the learners to pique their natural, intellectual curiosity.
- Limit category counts to be less than or equal to ten.
- At this grade level, more support is needed with formulating statistical questions. Students should be given guidance when developing statistical investigative questions. Students should be provided with support strategies for collecting and organizing their data.
- Students will display their data using objects and pictures. In later grades, students will represent data in pictographs and bar graphs.
- In Kindergarten, students should be able to use friendly language to explain their data and answer the overall question.
- The terminology below is used to clarify expectations for the teaching professional. Students are not required to use this terminology when engaging with the learning objective.
- A statistical investigative question is one that requires data that will vary. Examples: "How did you get to school today?"; "What is your favorite ____?"

1st Grade: Create a statistical investigative question that can be answered using data involving numerical values **within 20**. Collect, analyze, and interpret **categorical data** presented as **picture graphs** and **bar graphs** (with single-unit scales) with **up to three categories** from actual situations to answer the question posed.

Ask	Collect	Analyze	Interpret
Create a statistical investigative question that can be answered by gathering, representing, and interpreting data.	**Determine strategies for collecting and organizing data within 20 to answer a statistical investigative question.**	**Create a picture graph and a bar graph (with single-unit scale) to represent a data set with up to three categories. Analyze the information by asking and answering questions about the data.**	**Interpret categorical data to answer the statistical investigative question created, including total number of data points, how many in each category, and how many more or less are in one category than another.**

Instructional Supports

- Expectations in this grade level should be taught throughout the year and applied contextually to the current expectation and actual events.
- Students should formulate a statistical investigative question to explore a realistic situation in their classroom. Ex. "How many pets do you have?" is a statistical investigative question because it anticipates variability in students' responses.
- Students should be able to organize the data collected, represent the data on a table, and ask questions about the data generated. This expectation is limited to data with up to three categories presented in tables and charts. Students should be using tally marks and numerical values to organize and represent data.
- Students should use tally marks and numerical values within 20 to organize and represent the data. Students should be able to summarize the number of tally marks in each category.
- Students should be able to analyze and interpret categorical data on a provided pictograph or bar graph to answer the formulated statistical investigative question. On a picture graph, one symbol stands for a value of 1 at this grade level.
- Developing strategies for collecting data include students collaborating to determine ways to collect data. Data can be gathered from a variety of sources to answer the statistical investigative question posed.