Cobb County School District
2024-2025

MATHEMATICS

2nd Grade Mathematics Teaching & Learning Framework

Semester 1				Semester 2				
Unit 1 3 weeks	**Unit 2** 6 weeks	**Unit 3** 3 weeks	**Unit 4** 6 weeks	**Unit 5** 6 weeks	**Unit 6** 4 weeks	**Unit 7** 4 weeks	**Unit 8** 3 weeks	**Unit 9** 2 weeks
Using Tables, Graphs and Charts **2.MDR.5** **2.NR.2**	**Building Fluency with Addition and Subtraction** **2.NR.1,2** **2.PAR.4**	**Measuring Lengths and Distances** **2.MDR.5** **2.NR.2**	**Extending Place Value Understanding to 1,000** **2.NR.1,2** **2.PAR.4**	**Representing Sums and Differences within 1,000** **2.NR.1,2** **2.PAR.4** **2.MDR.5**	**Exploring Geometry and Patterns** **2.GSR.7** **2.PAR.4**	**Measuring Time and Money** **2.MDR.6** **2.PAR.4** **2.NR.2** **2.MDR.5**	**Reasoning with Equal Groups** **2.NR.2,3** **2.PAR.4**	**Culminating Capstone Unit**
2.MDR.5.4 (Data questions) **2.NR.2.1** (Fluently +/- within 10)	**2.NR.2.1** (Fluently +/- within 20) **2.NR.1.1** (Place value to 100) **2.NR.1.2** (Count forward & backward from a given number by ones within 100) **2.NR.1.3** (Represent, compare, and order to 100) **2.PAR.4.1** (Simple Numerical patterns within 100) **2.NR.2.2** (Find 10 and multiples of 10 more or less within 100) **2.NR.2.3** (Solve +/- 2-digit) **2.NR.2.4** (Fluently +/- within 100)	**2.MDR.5.1** (Unit models) **2.MDR.5.2** (Measure whole units) **2.MDR.5.3** (Compare length) **2.MDR.5.5** (Represent +/- on a number line) **2.NR.2.3** (Solve +/- 2-digit within 100) ***2.NR.2.1*** *(Fluently +/- within 20)* ***2.NR.2.4*** *(Fluently +/- within 100)*	**2.NR.1.1** (3-digit place value) **2.NR.1.3** (Represent, compare, order to 1,000) **2.NR.1.2** (Count forward/backward and skip count within 1,000) **2.NR.2.2** (Find 10/100 more or less) **2.PAR.4.1** (Numerical patterns to 1,000)	**2.NR.2.2** (Find 10/100 more or less and multiples of 10/100 within 1,000) **2.NR.2.3** (Solve +/- 2-digit) **2.NR.2.4** (Fluently +/- within 100) **2.MDR.5.5** (Represent +/- on a number line) **2.PAR.4.1** (Numerical patterns) **2.NR.1.2** (Count forward/backward 1,000) **2.MDR.5.4** (Data questions) ***2.NR.1*** ***(****Compare numbers to 1,000)* ***2.NR.2.1*** *(Fluently +/- within 20)*	**2.GSR.7.1** (2D/3D shapes) **2.GSR.7.2** (Symmetry) **2.GSR.7.3** (Partition shapes) **2.GSR.7.4** (Equal shares) **2.PAR.4.2** (Growing patterns) ***2.NR.1*** *(Counting and skip counting)*	**2.MDR.6.1** (Time and elapsed time) **2.MDR.6.2** (Money) **2.MDR.5.5** (Represent measurement problems on a number line) **2.PAR.4.1** (Numerical patterns) **2.NR.2.1** (Fluently +/- within 20) **2.NR.2.4** (Fluently +/- within 100) ***2.NR.2*** *(Solve problems within 1,000)* ***2.MDR.5.4*** *(Solve problems with data)*	**2.NR.3.1** (Even/Odd) **2.NR.3.2** (Arrays) **2.PAR.4.1** (Numerical patterns) **2.PAR.4.2** (Growing patterns) **2.NR.2.1** (Fluently +/- within 20) ***2.NR.1*** *(Read, write, compare within 1,000)* ***2.GSR.7*** *(Draw and partition equal-sized parts)*	**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, MP: Mathematical Practices, MDR: Measurement and 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

2nd Grade

The eight standards listed below are the key content competencies students will be expected to master in second 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.

SECOND GRADE STANDARDS
2.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.**
2.NR.1: **Using the place value structure, explore the count sequences to represent, read, write, and compare numerical values to 1000 and describe basic place-value relationships and structures.**
2.NR.2: **Apply multiple part-whole strategies, properties of operations and place value understanding to solve real-life, mathematical problems involving addition and subtraction within 1,000.**
2.NR.3: **Work with equal groups to gain foundations for multiplication through real-life, mathematical problems.**
2.PAR.4: **Identify, describe, extend, and create repeating patterns, growing patterns, and shrinking patterns.**
2.MDR.5: **Estimate and measure the lengths of objects and distance to solve problems found in real-life using standard units of measurement, including inches, feet, and yards and analyze graphical displays of data to answer relevant questions.**
2.MDR.6: **Solve real-life problems involving time and money.**
2.GSR.7: **Draw and partition shapes and other objects with specific attributes, and conduct observations of everyday items and structures to identify how shapes exist in the world.**

Georgia's K-12 Mathematics Standards - 2021

2nd Grade

NUMERICAL REASONING *– counting within 1000, place value, addition and subtraction, fluency to 20, developing multiplication through arrays*

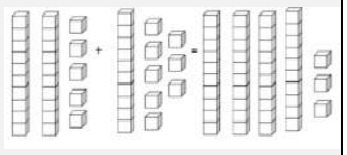
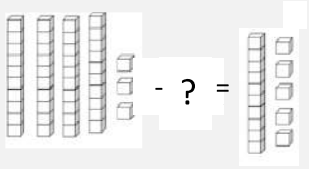
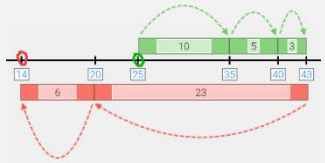
2.NR.1: Using the place value structure, explore the count sequences to represent, read, write, and compare numerical values to 1000 and describe basic place-value relationships and structures.

Expectations		Evidence of Student Learning (not all inclusive; see Grade Level Overview for more details)	
2.NR.1.1	Explain the value of a three-digit number using hundreds, tens, and ones in a variety of ways.	***Fundamentals*** ● Students should be able to put together (compose) and break apart (decompose) three-digit numbers. ● Students should have multiple opportunities use concrete materials to develop an understanding of the place value structures, the relationship between numbers, and the value of quantities.	***Strategies and Methods*** ● Students should use base ten materials to break apart (decompose) 327 into 3 hundreds, 2 tens, and 7 ones, or into 2 hundreds, 12 tens, and 7 ones. ● Students should be able to explain that a bundle of ten 10s is equal to 100.
2.NR.1.2	Count forward and backward by ones from any number within 1000. Count forward by fives from multiples of 5 within 1000. Count forward and backward by 10s and 100s from any number within 1000. Count forward by 25s from 0.	***Strategies and Methods*** ● Students should explore patterns on a hundred-chart, starting from a given number 10-90. ● Students can also use number lines to demonstrate their understanding. ● Students should be able to use coins to count, including nickels, dimes, quarters, and dollars. Half-dollars may also be used, if available.	
2.NR.1.3	Represent, compare, and order whole numbers to 1000 with an emphasis on place value and equality. Use >, =, and < symbols to record the results of comparisons.	***Strategies and Methods*** ● Representations should include concrete materials (i.e., base ten blocks, counters, etc.), base ten numerals, words, expanded form, and pictures.	***Age/Developmentally Appropriate*** ● Students should be able to represent a quantity from word form.

2.NR.2: Apply multiple part-whole strategies, properties of operations and place value understanding to solve real-life, mathematical problems involving addition and subtraction within 1,000.

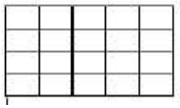
Expectations		Evidence of Student Learning (not all inclusive; see Grade Level Overview for more details)				
2.NR.2.1	Fluently add and subtract within 20 using a variety of mental, part-whole strategies.	***Terminology*** ● Fluently/Fluency – To achieve fluency, students should be able to	***Strategies and Methods*** – *see special note in appendix* ● Students should explain their	***Relevance and Application*** ● Students should be able to use numerical reasoning to solve relevant,	***Age/Developmentally Appropriate*** ● Reaching fluency is an ongoing process that	***Example*** ● A student makes sense of 29 + 6 by flexibly thinking:

		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.	approaches and produce accurate answers efficiently and appropriately using mental strategies that include counting on, making ten, decomposing a number leading to a ten, using the relationship between addition and subtraction, creating equivalent but easier or known sums. ● Examples of different strategies and representations can be found within the *Computational Strategies for Whole Numbers* document found in the appendices.	mathematical problems involving all problem types. Click here for a listing of all problem types.	will take much of the year. ● Students should know all sums of two one-digit numbers by the end of Grade 2.	"If I think of 6 as 1 + 5, I can add the 1 to the 29 first to make a ten (30), then add 5 more to get 35."
2.NR.2.2	Find 10 more or 10 less than a given three-digit number and find 100 more or 100 less than a given three-digit number.	***Strategies and Methods*** ● Tools such as a hundred chart and visual number lines may be used to help students discover the patterns of ten more and ten less.				
2.NR.2.3	Solve problems involving the addition and subtraction of two-digit numbers using part-whole strategies.	***Age/Developmentally Appropriate*** ● Students should work with practical, mathematical problems involving standard units of linear measurement (inches). Note: This is an ongoing process that will take much of the year. ● The sum of the numbers should be no greater than 1000. ● At this grade level, students should only be	***Relevance and Application*** ● Authentic problems should be presented to provide students with the opportunity to make sense of the mathematics in the world around them. ● Problems presented may involve money. ● Students should be able to solve practical, mathematical problems involving addition and subtraction within 1,000.	***Strategies and Methods*** – see special note in appendix ● Students should be given the opportunity to explore and develop a variety of flexible strategies and algorithms. ● Students should be able to solve one and two step mathematical problems within 100 and represent the problem by using concrete materials, drawings, and equations with a symbol for the unknown number.	***Example*** ● In the morning, there are 25 students in the cafeteria. 18 more students come in. After a few minutes, some students leave. If there are 14 students still in the cafeteria, how many students left the cafeteria? Write an equation for your problem.	

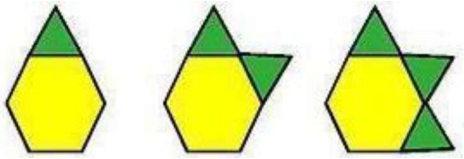
		expected to subtract up to two two-digit numbers and add up to four two-digit numbers.	• Students should be able to use numerical reasoning to solve authentic, mathematical problems involving all problem types. Click here for a listing of all problem types.	• Students should be able to use strategies that are based on a deep understanding of place-value in order to meet this expectation. • When solving problems, students should be given the opportunity to use concrete materials, drawings, tools, and part-whole reasoning strategies. • Students should be able to solve authentic, mathematical problems involving the addition of up to four two-digit numbers using strategies based on place value, properties of operations and the relationship between addition and subtraction.	  
2.NR.2.4	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	***Terminology*** • Fluently/Fluency – To achieve fluency, students should be able to choose flexibly among methods and strategies to solve mathematical problems accurately and efficiently.	***Age/Developmentally Appropriate*** • Students should be given multiple opportunities to solve applicable, mathematical problems as they work to build fluency. • The sum of the number should be no greater than 100.	***Relevance and Application*** • Students should be able to use numerical reasoning to solve applicable, mathematical problems involving all problem types. Click here for a listing of all problem types.	

2.NR.3: Work with equal groups to gain foundations for multiplication through real-life, mathematical problems.

Expectations		Evidence of Student Learning (not all inclusive; see Grade Level Overview for more details)			
2.NR.3.1	Determine whether a group (up to 20) has an odd or even number of objects. Write an equation to express an even number as a sum of two equal addends.	***Strategies and Methods*** • Students can group by pairing objects or counting them by 2s. • Students may also use doubles to determine if a quantity is even. For example, 18 is even because adding two nines equals 18 or 9 + 9 =18.		***Terminology*** • 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. ○ Addend – any number that is added to another number in an addition expression or equation. For example, in the expression 16 + 4, 16 and 4 are addends.	
2.NR.3.2	Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express	***Fundamentals*** • Students should be able to	***Strategies and Methods*** • Students should model using	***Example*** • Beth put 5 purses on each shelf. She has 4 shelves. Draw an array to model this. Write	***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.

	the total as a sum of equal addends.	partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	rectangular arrays to determine the number of objects and discuss their reasoning.	an equation to match the array.  5+5+5+5 =20	○ Rectangular array – an arrangement of objects into rows and columns that form a rectangle. ○ Addend – any number that is added to another number in an addition expression or equation. For example, in the expression 2 + 7 + 5, 2, 7 and 3 are addends.

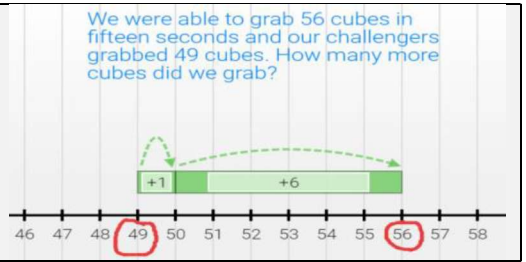
PATTERNING & ALGEBRAIC REASONING *– patterns up to 20 and addition and subtraction within 1,000*						
2.PAR.4: Identify, describe, extend, and create repeating patterns, growing patterns, and shrinking patterns.						
Expectations		**Evidence of Student Learning** **(not all inclusive; see Grade Level Overview for more details)**				
2.PAR.4.1	Identify, describe, and create a numerical pattern resulting from repeating an operation such as addition and subtraction.	***Age/Developmentally Appropriate*** ● Patterns involving addition and subtraction should include sums within 1,000 through models and representations.	***Relevance and Application*** ● Problems should be presented within real applications to provide students with the opportunity to make sense of the mathematics. ● Problems presented may involve money as a tool to make sense of the patterns.	***Fundamentals*** ● Students should investigate repeating patterns to make predictions and build algebraic reasoning. ● Patterns may include exposure to even and odd. ● Students should be using any tools available such as a number line, hundred-chart, 99-chart, etc., to create and analyze the patterns. ● Patterns should be extended from 1st grade, where they explore intervals of 1s, 2s, 5s, and 10s, to also include intervals of 25s and 100s.	***Strategies and Methods*** ● Students should be given the opportunity to use a variety of strategies to identify, describe, and create numerical patterns.	***Example*** ● Start with 3 and jump by 5s to create a pattern. Change the start number and create another pattern. What do you notice about the two patterns? How did they change?

2.PAR.4.2	Identify, describe, and create growing patterns and shrinking patterns involving addition and subtraction up to 20.	***Example*** ● Describe the growing pattern below and build the next two terms in the pattern. 

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

2.MDR.5: Estimate and measure the lengths of objects and distance to solve problems found in real-life using standard units of measurement, including inches, feet, and yards.

Expectations		Evidence of Student Learning (not all inclusive; see Grade Level Overview for more details)		
2.MDR.5.1	Construct simple measuring instruments using unit models. Compare unit models to rulers.	***Strategies and Methods*** ● Students should discuss how measurement with iterating individual one-inch units, such as one-inch tiles, compares with measurement using an instrument such as a standard ruler.	***Terminology*** ● Iterating one inch units means using several individual (inch) units, such as 1-inch tiles, and setting them next to one another to measure the length of an object.	***Age/Developmentally Appropriate*** ● In Grade 1, students used one-inch items as non-standard units of measure for length. In Grade 2, students compare a constructed ruler with standard rulers and compare the use of the devices.
2.MDR.5.2	Estimate and measure the length of an object or distance to the nearest whole unit using appropriate units and standard measuring tools.	***Strategies and Methods*** ● Students should be able to use appropriate measuring tools such as rulers, yardsticks, and measuring tapes. ● Units of measure include inches, feet, and yards		
2.MDR.5.3	Measure to determine how much longer one object is than another and express the length difference in terms of a standard-length unit.	***Fundamentals*** ● This is the first time students are introduced to a standard-length unit such as an inch.	***Strategies and Methods*** ● Students should use tools such as rulers, measuring tapes, and yardsticks to obtain measurements.	***Example*** ● I measured my two pet parakeets. One was 7 inches long and one was 15 inches long. The larger one is 8 inches longer than the smaller one.
2.MDR.5.4	Ask questions and answer them based on gathered information, observations, and appropriate graphical displays to solve problems relevant to everyday life.	***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.		***Strategies and Methods*** ● Questions should be student generated.
2.MDR.5.5	Represent whole-number sums and differences within a standard unit of measurement on a number line diagram.	***Fundamentals*** ● Students should be able to represent sums and differences presented in practical,	***Age/Developmentally Appropriate*** ● This prepares students to use number lines for fractions in higher grades.	***Example***

		mathematical problems on a number line diagram.		

2.MDR.6: Solve real-life problems involving time and money.

Expectations		Evidence of Student Learning (not all inclusive; see Grade Level Overview for more details)			
2.MDR.6.1	Tell and write time from analog and digital clocks to the nearest five minutes, and estimate and measure elapsed time using a timeline, to the hour or half hour on the hour or half hour.	***Fundamentals*** ● Students should be able to categorize daily activities by a.m. and p.m.	***Age/Developmentally Appropriate*** ● Problems involving elapsed time in second grade should be written so as to avoid crossing over a.m. and p.m.	***Strategies and Methods*** ● 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.	***Example*** ● Denise had soccer practice after school today. Practice began at 3:30 and ended at 6:00. How much time did she spend at soccer practice?
2.MDR.6.2	Find the value of a group of coins and determine combinations of coins that equal a given amount that is less than one hundred cents, and solve problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately.	***Age/Developmentally Appropriate*** ● This is the first time students are required to find the value of a group of coins. ● The total quantity should be based on cents and the value of a group of coins should be less than 100 cents. ● Use of written decimal numbers is not an expectation for this grade level. ● The $ symbol should only be used when referring to whole dollar amounts at this grade level. ● Students should be able to solve applicable, mathematical problems that involve either only dollars or only cents. ● Dollar bills may include $1, $5, $10, $20, and $100.		***Fundamentals*** ● Students should be able to identify the values of pennies, nickels, dimes, and quarters. Half-dollars may also be investigated, if available.	***Strategies and Methods*** ● Students should be given opportunities to explore this concept using hands-on manipulatives. Virtual manipulatives may also be used.

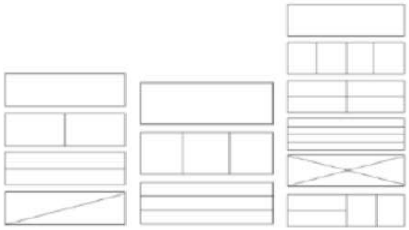
GEOMETRIC & SPATIAL REASONING *– sorting shapes, lines of symmetry, partitioning circles and rectangles*

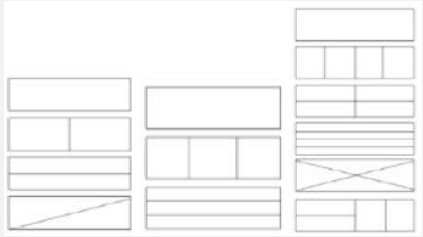
2.GSR.7: Draw and partition shapes and other objects with specific attributes and conduct observations of everyday items and structures to identify how shapes exist in the world.

<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>2.GSR.7.1</td><td>Describe, compare and sort 2-D shapes including polygons, triangles, quadrilaterals, pentagons, hexagons, and 3-D shapes including rectangular prisms and cones, given a set of attributes.</td><td colspan="5">Relevance and Application
● Students should be able to use spatial reasoning to analyze shapes in the environment.

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 should describe shapes based on attributes.

Terminology
● Attributes – characteristics of a two-dimensional or three-dimensional shape
● Vertices – corners of a geometric figure
● Rectangular prism – a three-dimensional shape that has a rectangular base (This also includes objects with square bases, such as cubes.)

Example
● Describe a shape based on its attributes and compare and sort a collection of shapes based on the number of angles, vertices, sides, and equal faces.</td></tr>
<tr><td>2.GSR.7.2</td><td>Identify at least one line of symmetry in everyday objects to describe each object as a whole.</td><td colspan="2">Age/Developmentally Appropriate
● Students should investigate symmetry using a variety of materials, such as miras and paper folding.
● Students at this grade level should describe the everyday objects using the line of symmetry.</td><td colspan="2">Strategies and Methods
● Students should be provided multiple opportunities to investigate symmetry through paper folding and/or the use of mirrors.
● Students should develop an understanding of what a line of symmetry is through exploration with real-world objects.</td><td>Example
● Identify lines of symmetry seen in everyday objects, such as a butterfly, stop sign, flower, or dragonfly. Identify lines of symmetry seen and how they connect to the object.
● Sample student response: “I can see that the butterfly looks the same on each wing, but it looks backward, like a mirror, on the other side of the line of symmetry.”</td></tr>
<tr><td>2.GSR.7.3</td><td>Partition circles and rectangles into two, three, or four equal shares. Identify and describe equal-sized parts of the whole using fractional names (“halves,” “thirds,” “fourths”, “half of,” “third of,” “quarter of,” etc.).</td><td>Fundamentals
● Students have explored quarters and halves in first grade and are extending their understanding of fractions to thirds.</td><td>Strategies and Methods
● Students are not expected to precisely partition circles into thirds, but rather partition circles and rectangles into thirds close enough to be described as three equal parts.</td><td>Age/Developmentally Appropriate
● Partitioning shapes prepares students to reason about fractions in upper grades.
● Shading is not an expectation within images for this grade because the student is only required to partition the whole shape into equal shares.</td><td colspan="2">Examples
 
Halves Thirds Fourths (Quarters)</td></tr>
</table>

					Below is a student work sample showing a second grade student's two attempts at partitioning a circle into thirds during a mini lesson. As she is making sense of what happens when you partition a circle into thirds, she realizes that each part represents the same quantity and is one third of the whole circle (approximate partitions are sufficient for beginning phases of understanding development related to quantity):  
2.GSR.7.4	Recognize that equal shares of identical wholes may be different shapes within the same whole.	***Strategies and Methods*** ● Students should explore rectangles and circles being partitioned in multiple ways to recognize that equal shares may be different shapes within the same whole.	***Age/Developmentally Appropriate*** ● Shading is not an expectation within images for this grade because the student is only required to partition the whole shape into equal shares.		***Examples***  **Halves** **Thirds** **Fourths (Quarters)** ○ Students should be able to recognize that even though shapes may be partition differently, they still have the same relationship to the whole.

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.

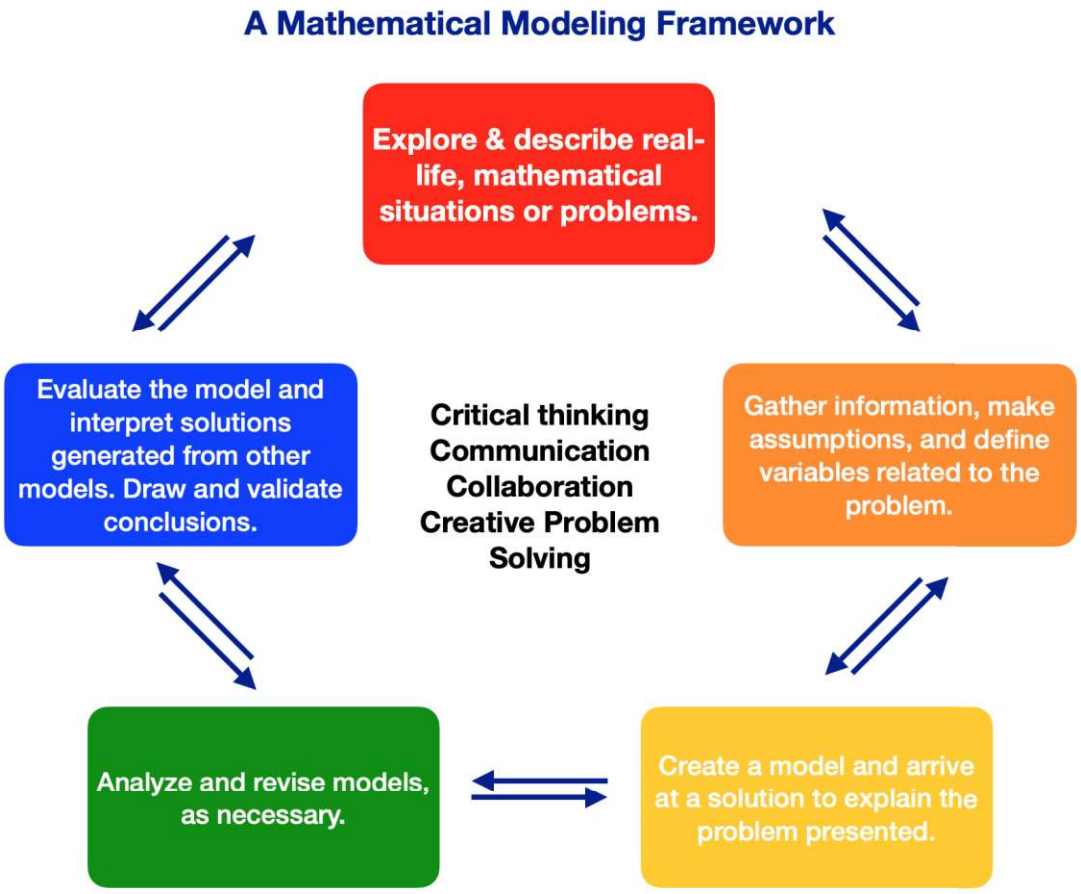


Image adapted from: Suh, Matson, Seshaiyer, 2017

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.

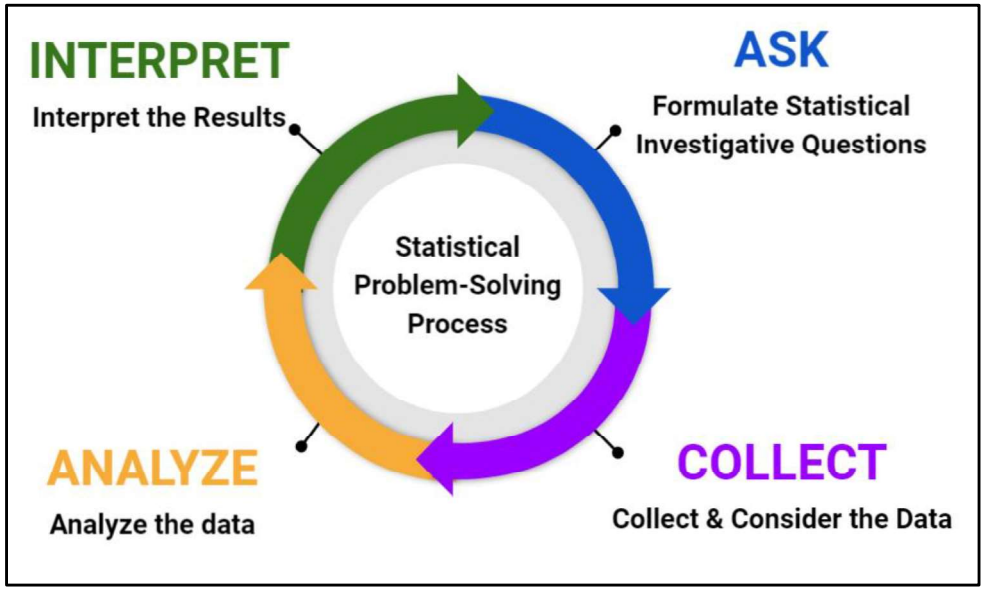


FIGURE 1: GEORGIA FRAMEWORK FOR STATISTICAL REASONING

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.

2nd Grade: Create statistical investigative questions that can be answered using data. Collect, analyze, and interpret categorical data presented as picture graphs and bar graphs (with single-unit scales) with **up to four categories** from real situations to answer questions.

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 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 four categories. Analyze the information by asking and answering questions about the data.**	**Interpret categorical data to answer the statistical investigative question created.**

Instructional Supports

- Expectations in this grade level should be taught throughout the year and applied contextually to the current expectation and real events.
- Students should formulate a statistical investigative question to explore an authentic situation in their classroom.
- The data collection can occur through the use of surveys and scientific observations. Tables and tally marks can be used to organize data.
- Pictographs and bar graphs used at this grade level should represent a data set with no more than four categories.
- Students should solve simple join, separate, and compare problems using information presented.
- Students should use addition and subtraction to create and obtain information from tables, pictographs, bar graphs, and tally charts.

3rd Grade: Create statistical investigative questions that can be answered using data. Collect, analyze, and interpret numerical and categorical data involving **whole number values** obtained from real situations to answer questions.

Ask	Collect	Analyze	Interpret
Create a statistical investigative question that can be answered using data from authentic situations.	**Determine strategies for collecting and organizing numerical data and categorical data involving whole number values to answer a statistical investigative question.**	**Create pictographs, bar graphs, and dot plots with a variety of scales, using appropriate titles, labels, and units within the graphical display.**	**Interpret categorical and numerical data to answer the statistical investigative question created.**

Instructional Supports

- Expectations in this grade level should be taught throughout the year and applied contextually to the current expectation and actual life events.
- In previous grade levels, students analyzed categorical data. In third grade, this is extended to include numerical data analysis.
- Students should formulate a statistical investigative question to explore a real situation in their classroom.
- Students should be provided with learning experiences to collect and analyze both numerical data and categorical data.
- Some problems should include reading bar graphs, pictographs, and dot plots, as well as customary measurements. Dot plots and line plots can be used interchangeably. Dot plots should be used for numerical data representation on a number line.
- 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. Data sets for categorical data may include several categories.
- The scales of the pictographs, bar graphs, and dot plots should depend on the data collected. On a pictograph, one symbol may stand for a value greater than 1 to allow students to apply their understanding of single digit multiplication and division facts.
- Students should use a ruler that is marked at halves and fourths only to create an evenly spaced number line for the dot plot.
- *Numerical data* - data that can be expressed in numbers rather than natural language. An example of numerical data that could be collected is the number of people who attended the movie theater over the course of a month.
- *Categorical data* - a type of data used to group information with similar characteristics. Examples of categorical data that could be collected might be marital status, favorite sport, or favorite type of movie.

COMPUTATIONAL STRATEGIES FOR WHOLE NUMBERS

Mathematics Place-Value Strategies and US Traditional Algorithms

Specific mathematics strategies for teaching and learning are not mandated by the Georgia Department of Education or assessed on state or federally mandated tests. Students may solve problems in different ways and have the flexibility to choose a mathematical strategy that allows them to make sense of and strategically solve problems using efficient methods that are most comfortable for and makes sense to them. It is critical that teachers and parents remain partners to help each child grow to become a mathematically literate citizen. These standards preserve and affirm local control and flexibility.

In mathematics, the emphasis is on the reasoning and thinking about the quantities within mathematical contexts. Algorithms, tape diagrams (bar models), and number line representations are a few examples of ways that students communicate their strategic thinking in a written form.

Addition Example: 1573 + 796

US Traditional Algorithm:

$$\begin{array}{r} {\scriptstyle 1\ \ 1\ \ \ \ } \\ 1\ 5\ 7\ 3 \\ +\ \ 7\ 9\ 6 \\ \hline 2\ 3\ 6\ 9 \end{array}$$

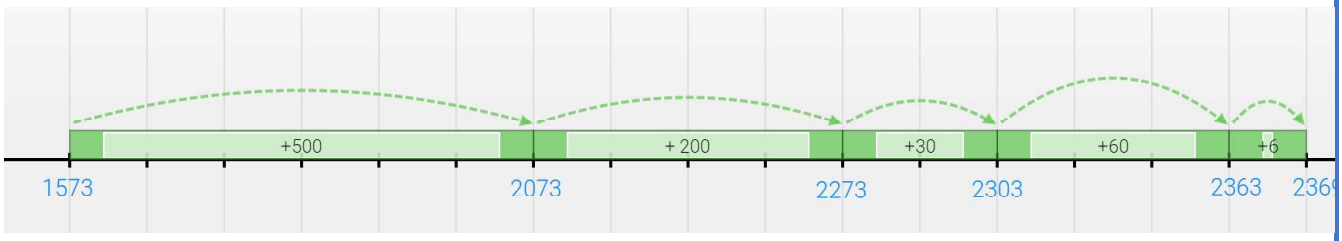
Description:

As students make sense of and use addition strategies and algorithms, it is important for them to be given the flexibility to use a part-whole strategy such as place value partitioning, adding on in parts, estimation and compensation, and friendly numbers to communicate their thinking using a written recording of that strategy that is most comfortable for and makes sense to them. Students should be able to demonstrate a deep understanding of the relationship between the quantities presented in the mathematics number sentence and to attend to precision in their explanations. Flexibility in thinking is key!

Place Value Algorithm:

$$\begin{array}{rrrr} 1 & 5 & 7 & 3 \\ + & 7 & 9 & 6 \\ \hline & & & 9 \\ + & 1 & 6 & 0 \\ + & 1 & 2 & 0 & 0 \\ + & 1 & 0 & 0 & 0 \\ \hline 2 & 3 & 6 & 9 \end{array}$$

Number Line Representation:



It is important to note that the examples of strategies provided in the tables are not all inclusive. Students may solve problems in different ways and have the flexibility to choose a mathematical strategy that allows them to make sense of and strategically solve problems using efficient methods that are most comfortable for and makes sense to them.

Subtraction Example: 2145 - 178

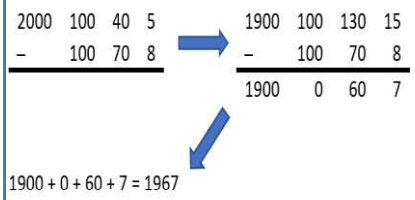
US Traditional Algorithm:

$$\begin{array}{r} {\scriptstyle 0\ \ 13\ \ 15} \\ 2\ \ \not{1}\ \ \not{4}\ \ \not{5} \\ -\quad 1\ \ 7\ \ 8 \\ \hline 1\ \ 9\ \ 6\ \ 7 \end{array}$$

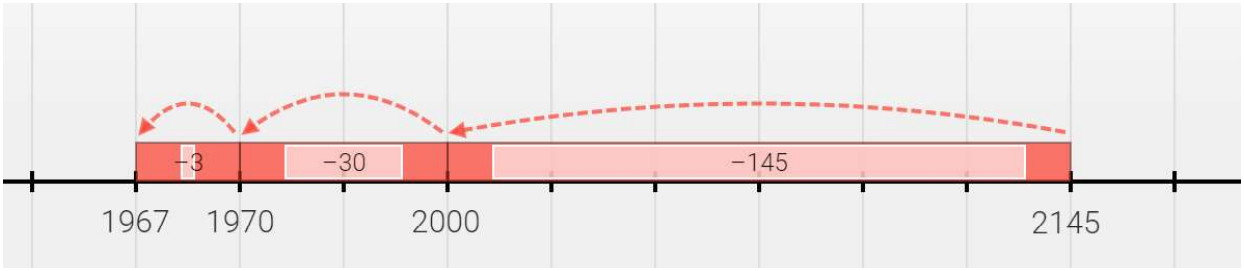
Description:

As students make sense of and use subtraction strategies and algorithms, it is important for them to be given the flexibility to use a part-whole strategy such as place value partitioning, adding up, counting back in chunks, and same difference and communicate their thinking using a written recording of that strategy that is most comfortable for and makes sense to them. Students should be able to demonstrate a deep understanding of the relationship between the quantities presented in the mathematics number sentence and to attend to precision in their explanations. Flexibility in thinking is key!

Place Value Algorithm:



Number Line Representation:



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