

**Bermudian Springs Pennsylvania Core Standards
Math Framework
Second Grade**



Introduction

Bermudian Springs School District, in partnership with all stakeholders, recognizes the importance of our students being able to use mathematics in everyday life and in the workplace. New knowledge, tools, and ways of solving math problems will significantly enhance opportunities for shaping our students future. Math competencies open doors to productive futures. All students should have the opportunity and support necessary to learn significant math with depth and understanding. *Common Core* has provided critical areas designed to bring focus to the standards at each grade by describing key concepts in order to guide instruction. The critical areas for instructional focus for second grade math outlined by the *Common Core* include the following four areas:

- 1. Extending understanding of base-ten notation.** Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).
- 2. Building fluency with addition and subtraction.** Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.
- 3. Using standard units of measure.** Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.
- 4. Describing and analyzing shapes.** Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

Adapted from: commoncore.org, 2013; parcconline.org, 2013; pdesas.org, 2013

Standards for Mathematical Practice in Second Grade

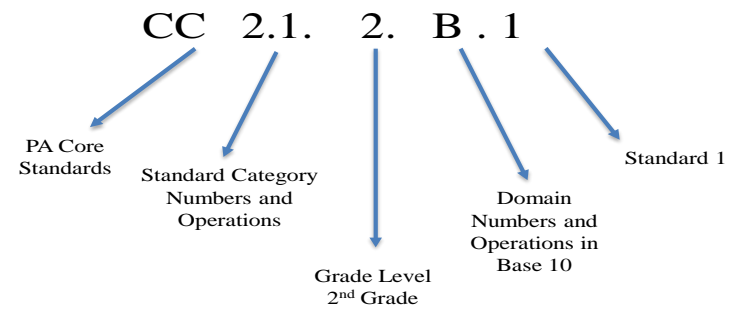
Bermudian Springs School District incorporated the following Mathematical Practices which are expected to be integrated into every mathematics lesson for all students as outlined in the Pennsylvania Core Standards. Below are a few examples of how these mathematical practices may be integrated into some tasks that Bermudian students will apply in second grade.

1. Make Sense and Persevere in Solving Problems.	Mathematically proficient students in Second Grade examine problems and tasks, can make sense of the meaning of the task and find an entry point or a way to start the task. Second Grade students also develop a foundation for problem solving strategies and become independently proficient on using those strategies to solve new tasks. In Second Grade, students' work continues to use concrete manipulatives and pictorial representations as well as mental mathematics. Second Grade students also are expected to persevere while solving tasks; that is, if students reach a point in which they are stuck, they can reexamine the task in a different way and continue to solve the task. Lastly, mathematically proficient students complete a task by asking themselves the question, "Does my answer make sense?"
2. Reason abstractly and quantitatively.	Mathematically proficient students in Second Grade make sense of quantities and relationships while solving tasks. This involves two processes- decontextualizing and contextualizing. In Second Grade, students represent situations by decontextualizing tasks into numbers and symbols. For example, in the task, "There are 25 children in the cafeteria and they are joined by 17 more children. How many students are in the cafeteria? " Second Grade students translate that situation into an equation, such as: $25 + 17 = \underline{\quad}$ and then solve the problem. Students also contextualize situations during the problem solving process. For example, while solving the task above, students can refer to the context of the task to determine that they need to subtract 19 since 19 children leave. The processes of reasoning also other areas of mathematics such as determining the length of quantities when measuring with standard units.
3. Construct viable arguments and critique the reasoning of others.	Mathematically proficient students in Second Grade accurately use definitions and previously established solutions to construct viable arguments about mathematics. During discussions about problem solving strategies, students constructively critique the strategies and reasoning of their classmates. For example, while solving $74 - 18$, students may use a variety of strategies, and after working on the task, can discuss and critique each others' reasoning and strategies, citing similarities and differences between strategies.
4. Model with mathematics.	Mathematically proficient students in Second Grade model real-life mathematical situations with a number sentence or an equation, and check to make sure that their equation accurately matches the problem context. Second Grade students use concrete manipulatives and pictorial representations to provide further explanation of the equation. Likewise, Second Grade students are able to create an appropriate problem situation from an equation. For example, students are expected to create a story problem for the equation $43 + 17 = \underline{\quad}$ such as "There were 43 gumballs in the machine. Tom poured in 17 more gumballs. How many gumballs are now in the machine?"
5. Use appropriate tools strategically.	Mathematically proficient students in Second Grade have access to and use tools appropriately. These tools may include snap cubes, place value (base ten) blocks, hundreds number boards, number lines, rulers, and concrete geometric shapes (e.g., pattern blocks, 3-d solids). Students also have experiences with educational technologies, such as calculators and virtual manipulatives,

	which support conceptual understanding and higher-order thinking skills. During classroom instruction, students have access to various mathematical tools as well as paper, and determine which tools are the most appropriate to use. For example, while measuring the length of the hallway, students can explain why a yardstick is more appropriate to use than a ruler.
6. Attend to precision.	Mathematically proficient students in Second Grade are precise in their communication, calculations, and measurements. In all mathematical tasks, students in Second Grade communicate clearly, using grade-level appropriate vocabulary accurately as well as giving precise explanations and reasoning regarding their process of finding solutions. For example, while measuring an object, care is taken to line up the tool correctly in order to get an accurate measurement. During tasks involving number sense, students consider if their answer is reasonable and check their work to ensure the accuracy of solutions.
7. Look for and make use of structure.	Mathematically proficient students in Second Grade carefully look for patterns and structures in the number system and other areas of mathematics. For example, students notice number patterns within the tens place as they connect skip count by 10s off the decade to the corresponding numbers on a 100s chart. While working in the Numbers in Base Ten domain, students work with the idea that 10 ones equals a ten, and 10 tens equals 1 hundred. In addition, Second Grade students also make use of structure when they work with subtraction as missing addend problems, such as $50 - 33 = \underline{\quad}$ can be written as $33 + \underline{\quad} = 50$ and can be thought of as, "How much more do I need to add to 33 to get to 50?"
8. Look for and express regularity in repeated reasoning.	Mathematically proficient students in Second Grade begin to look for regularity in problem structures when solving mathematical tasks. For example, after solving two digit addition problems by decomposing numbers ($33 + 25 = 30 + 20 + 3 + 5$), students may begin to generalize and frequently apply that strategy independently on future tasks. Further, students begin to look for strategies to be more efficient in computations, including doubles strategies and making a ten. Lastly, while solving all tasks, Second Grade students accurately check for the reasonableness of their solutions during and after completing the task.

Mathematical Standards: Development and Progression											
	Pre K	K	1	2	3	4	5	6	7	8	HS
2.1 Numbers and Operations	(A) Counting & Cardinality										
		(B) Number & Operations in Base Ten						(D) Ratios & Proportional Relationships			(F) Number & Quantity
					(C) Number & Operations - Fractions			(E) The Number System			
2.2 Algebraic Concepts	(A) Operations and Algebraic Thinking							(B) Expressions and Equations			(D) Algebra
										(C) Functions	
2.3 Geometry	(A)Geometry										
2.4 Measurement, Data and Probability	(A) Measurement and Data							(B) Statistics and Probability			
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Standard Taxonomy



2.1 Number and Operations	
Domain: (B) Numbers and Operations in Base Ten	
Standard: CC.2.1.2.B.1 Use place value concepts to represent amounts of tens and ones and to compare three digit numbers.	
Key Concepts	Key Vocabulary
Use place value concepts, represent tens & ones, compare 3 digit numbers	place value, tens, ones, digit, compare, hundreds, greater than, less than, equal to
Competencies	
<i>Describe what students should be able to do (key skills) as a result of this instruction</i>	
<ul style="list-style-type: none"> • Compare 3 digit numbers • Construct tens and ones using base ten blocks 	

2.1 Number and Operations	
Domain: (B) Numbers and Operations in Base Ten	
Standard: CC.2.1.2.B.2 Use place value concepts to read, write and skip count to 1000.	
Key Concepts	Key Vocabulary
Use place value concepts, read numbers to 1,000, write numbers to 1,000, skip count to 1,000	place value, skip count, ones, tens, hundreds, thousands
Competencies	
<i>Describe what students should be able to do (key skills) as a result of this instruction</i>	
<ul style="list-style-type: none"> • Read numbers to 1,000 • Skip Count to 1,000 • Formulate numbers to 1,000 • Identify place value of 3 digit numbers 	

2.1 Number and Operations	
Domain: (B) Numbers and Operations in Base Ten Standard: CC.2.1.2.B.3 Use place value understanding and properties of operations to add and subtract within 1000.	
Key Concepts	Key Vocabulary
Place value, understand the properties of operations to add & subtract within 1,000	place value, addition properties, subtract, properties, sum, difference
Competencies <i>Describe what students should be able to do (key skills) as a result of this instruction</i>	
<ul style="list-style-type: none"> Solve 2 or 3 digit arithmetic using place value understanding and properties of operations 	

2.2 Algebraic Concepts

Domain: (A) Operations and Algebraic Thinking

Standard: CC.2.2.2.A.1 **Represent and solve problems involving addition and subtraction within 100.**

Key Concepts

Show and solve problems using addition & subtraction to 100

Key Vocabulary

addition, subtraction, number sentences, number models

Competencies

Describe what students should be able to do (key skills) as a result of this instruction

- Adding and subtracting within 100
- Create and solve addition and subtraction number stories

2.2 Algebraic Concepts

Domain: (A) Operations and Algebraic Thinking

Standard: CC.2.2.2.A.2 Use **mental strategies to add and subtract within 20**.

Key Concepts

Use mental strategies to add and subtract within 20.

Key Vocabulary

mental math, strategies, addition, subtraction

Competencies

Describe what students should be able to do (key skills) as a result of this instruction

- Quickly solve oral or written mental math problems without using manipulatives.
- Students will add and subtract fluently

2.2 Algebraic Concepts

Domain: (A) Operations and Algebraic Thinking

Standard: CC.2.2.2.A.3 Work with equal groups of objects to gain foundations for multiplication.

Key Concepts

Work with equal groups of objects, gain foundations for multiplication

Key Vocabulary

equal grouping, multiplication, repeated addition

Competencies

Describe what students should be able to do (key skills) as a result of this instruction

- Count the number of objects and arrange objects into equal groups
- Represent multiplication problems (using manipulatives)
- Apply skip counting concepts to gain foundation for multiplication
- Prove multiplication problems by using repeated addition

2.3 Geometry	
Domain: (A) Geometry	
Standard: CC.2.3.2.A.1 Analyze and draw two- and three- dimensional shapes having specified attributes.	
Key Concepts	Key Vocabulary
Analyze two-to-three dimensional shapes Draw specified attributes	Two dimensional shapes, three dimensional shapes, attributes, square, triangle, circle, rhombus, rectangle, cube, cone block, pyramid, rectangular prism
Competencies	
<i>Describe what students should be able to do (key skills) as a result of this instruction</i>	
<ul style="list-style-type: none"> • Design and construct 2 and 3D shapes • Locate 2 and 3D shapes in the world • Recognize and identify 2 and 3D shapes 	

2.3 Geometry

Domain: (A) Geometry

Standard: CC.2.3.2.A.2 Use the understanding of fractions to partition shapes into halves, quarters, and thirds.

Key Concepts

Use the understanding of fractions, Partition
Shapes – halves, quarters, thirds.

Key Vocabulary

halves, quarters, thirds, fraction, shaded, equal parts

Competencies

Describe what students should be able to do (key skills) as a result of this instruction

- Students can demonstrate lines of symmetry
- Separate objects into equal groups to show halves, quarters, thirds

2.4 Measurement, Data and Probability

Domain: (B) Measurement and Data

Standard: CC.2.4.2.A.1 Measure and estimate lengths in standard units using appropriate tools

Key Concepts

Measure lengths in standard units, estimate lengths in standard units

Key Vocabulary

measurement, standard unit, estimation, length, ruler, yardstick, foot/feet, inch, meter, centimeter

Competencies

Describe what students should be able to do (key skills) as a result of this instruction

- Students will estimate and measure items using standard units of measurement
- Estimate and measure items around the classroom
- Distinguish between appropriate tools of measurement
- Estimate and measure objects to the nearest whole and half foot, inch and centimeter
- Estimate the appropriate standard unit used to measure a given object

2.4 Measurement, Data and Probability

Domain: (B) Measurement and Data

Standard: CC.2.4.2.A.2 Tell and write time to the nearest five minutes using both analog and digital clocks.

Key Concepts

Tell time to the nearest five minutes, Write time to the nearest five minutes

Key Vocabulary

analog, digital, nearest, minute hand, hour hand, clockwise, counter clockwise

Competencies

Describe what students should be able to do (key skills) as a result of this instruction

- Identify, tell, and write time to the nearest 5 minutes
- Show time to the nearest 5 minutes
- Calculate elapsed time to the 5 minute interval in a given situation (total elapsed time limited to 30 minutes or less)

2.4 Measurement, Data and Probability

Domain: (B) Measurement and Data

Standard: CC.2.4.2.A.3 Solve problems using coins and paper currency with appropriate symbols.

Key Concepts

- Calculate and compare money amounts up to \$2.00
- Utilize appropriate money symbols
- Make change for an amount up to \$2.00 with no more than \$1.00 change given

Key Vocabulary

coins, currency, addition, subtraction, sum, difference, cent, symbol, decimal, decimal notation, dollar sign

Competencies

Describe what students should be able to do (key skills) as a result of this instruction

- Calculate/compare money amounts up to \$2.00
- Utilize appropriate money symbols
- Make change for an amount up to \$2.00 with no more than \$1.00 change given

2.4 Measurement, Data and Probability

Domain: (B) Measurement and Data

Standard: CC.2.4.2.A.4 **Represent and interpret data using line plots, picture graphs, and bar graphs.**

Key Concepts

Represent and interpret data using line plots, picture graphs, and bar graphs.

Key Vocabulary

bar graphs, picture graphs, line plots, data

Competencies

Describe what students should be able to do (key skills) as a result of this instruction

- Collect and display data using line plots, picture graphs and bar graphs
- Analyze and synthesize information from a graph

2.4 Measurement, Data and Probability

Domain: (B) Measurement and Data

Standard: CC.2.4.2.A.6 **Extend the concepts of addition and subtraction to problems involving length.**

Key Concepts

Extend the concepts of addition and subtraction to problems involving length

Key Vocabulary

Addition, subtraction, length, perimeter

Competencies

Describe what students should be able to do (key skills) as a result of this instruction

- Extend addition & subtraction to include length.
- Find the perimeter of an object
- Solve real world and mathematical problems using addition and subtraction of various units of length