

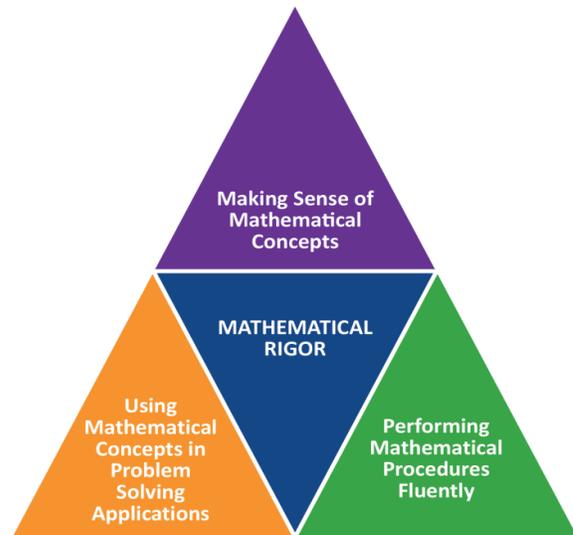
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The Massachusetts Department of Elementary and Secondary Education adopted revised frameworks for mathematics in March 2017. Students who meet the standards outlined in the *2017 Massachusetts Framework for Mathematics* are able to identify problems, represent problems, justify conclusions, and apply mathematics to practical situations. They build a strong foundation for applying these understandings and skills to solve real world problems.

The Cambridge Public Schools is committed to providing all students with experiences that create lifelong problem solvers, who can collaborate, adapt, and adjust to a diverse and an ever-changing society. **We believe that students should engage with meaningful real-world problems everyday.**

To achieve mathematical understanding, students should be actively engaged in meaningful and rigorous mathematics. The Mathematics Curriculum Framework's *content standards* and *practice standards* focus on developing students in the all of the following areas:

- **Conceptual understanding** – make sense of the math, reason about and understand math concepts and ideas
- **Procedural skills** – know mathematical facts, compute and do the math
- **Capacity** – solve a wide range of problems in various contexts by reasoning, thinking, and **applying** the mathematics they have learned.



When students are first introduced to a mathematical concept, they explore and investigate the concept by using concrete objects, visual models, drawings, or representations to build their understanding. This serves to develop a strong understanding of number sense, decomposing and composing numbers, the relationship between addition and subtraction, and multiplication and division. Students reach fluency by building understanding of mathematical concepts and by building automaticity in the recall of basic computation facts. As students apply their mathematical knowledge and skills to solve real-world problems, they also gain an understanding of the importance of mathematics throughout their lives.

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**In grade 2, instructional time should focus on three critical areas:**

- (1) extending understanding of base ten notation;**
- (2) building fluency with addition and subtraction;**
- (3) using standard units of measure; and**
- (4) describing and analyzing shapes.**

- (1) 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) 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) 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) 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.

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**Standards for Mathematical Practice**

*The 2017 framework continues to put emphasis on the Standards for Mathematical Practice. These standards complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years. These standards are the same at all grades from Prekindergarten to 12<sup>th</sup> grade. These eight practices can be clustered into the following categories as shown in the chart below:*

<p style="text-align: center;"><b><i>Habits of Mind of a Productive Mathematical Thinker:</i></b></p> <p>MP.1: Make sense of problems and persevere in solving them.</p> <p>MP.6: Attend to precision.</p>	<p><b><i>Reasoning and Explaining</i></b></p> <p>MP.2: Reason abstractly and quantitatively.</p> <p>MP.3: Construct viable arguments and critique the reasoning of others</p>
	<p><b><i>Modeling and Using Tools</i></b></p> <p>MP.4: Model with mathematics.</p> <p>MP.5: Use appropriate tools strategically.</p>
	<p><b><i>Seeing Structure and Generalizing</i></b></p> <p>MP.7: Look for and make use of structure.</p> <p>MP.8: Look for and express regularity in repeated reasoning.</p>

***The Standards for Mathematical Practice in Grade 2***

The Pre-K – 12 Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. The following lists examples of what the practice standards look like in Grade 4.

<b><i>Standards</i></b>	<b><i>Explanations and Examples</i></b>
<p><i>Students are expected to:</i></p> <p><b>1. Make sense of problems and persevere in solving them.</b></p>	<p>Mathematically proficient students in Grade 2 examine problems (tasks), can make sense of the meaning of the task and find an entry point or a way to start the task. Grade 2 students also develop a foundation for problem solving strategies and become independently proficient on using those strategies to solve new tasks. In Grade 2, students’ work still relies on concrete manipulatives and pictorial representations as students solve tasks unless the CCSS refers to the</p>

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	<p>word fluently, which denotes mental mathematics. Grade 2 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?"</p>
<p><i>Students are expected to:</i>  <b>2. Reason abstractly and quantitatively.</b></p>	<p>Mathematically proficient students in Grade 2 make sense of quantities and the relationships while solving tasks. This involves two processes de-contextualizing and contextualizing. In Grade 2, 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. Then, if 19 of those children then leave, how many are still there?" Grade 2 students are expected to translate that situation into the equation: <math>25 + 17 - 19 = \underline{\quad}</math> and then solve the task. 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 apply to Grade 2 as students begin to measure with standard measurement units by determining the length of quantities based on particular units of measure.</p>
<p><i>Students are expected to:</i>  <b>3. Construct viable arguments and critique the reasoning of others.</b></p>	<p>Mathematically proficient students in Grade 2 accurately use definitions and previously established solutions to construct viable arguments about mathematics. In Grade 2 during discussions about problem solving strategies, students constructively critique the strategies and reasoning of their classmates. For example, while solving <math>74 + 18 - 37</math>, students may use a variety of strategies, and after working on the task, can discuss and critique each other's reasoning and strategies, citing similarities and differences between strategies.</p>
<p><i>Students are expected to:</i>  <b>4. Model with mathematics.</b></p>	<p>Mathematically proficient students in Grade 2 model real-life mathematical situations with a number sentence or an equation, and check to make sure that their equation accurately matches the</p>

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	<p>problem context. Grade 2 students still will rely on concrete manipulatives and pictorial representations while solving problems, but the expectation is that they will also write an equation to model problem situations. Likewise, Grade 2 students are expected to create an appropriate problem situation from an equation. For example, students are expected to create a story problem for the equation <math>24 + 17 - 13 = \underline{\quad}</math>.</p>
<p><i>Students are expected to:</i>  <b>5. Use appropriate tools strategically.</b></p>	<p>Mathematically proficient students in Grade 2 have access to and use tools appropriately. These tools may include place value (base ten) blocks, hundreds number boards, number lines, and concrete geometric shapes (e.g., pattern blocks, 3D solids). Students should also have experiences with educational technologies, such as calculators and virtual manipulatives that support conceptual understanding and higher order thinking skills. During classroom instruction, students should have access to various mathematical tools as well as paper, and determine which tools are the most appropriate to use. For example, while solving <math>28+17</math>, students can explain why place value blocks are more appropriate than counters.</p>
<p><i>Students are expected to:</i>  <b>6. Attend to precision.</b></p>	<p>Mathematically proficient students in Grade 2 are precise in their communication, calculations, and measurements. In all mathematical tasks, students in Grade 2 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 objects iteratively (repetitively), students check to make sure that there are no gaps or overlaps. During tasks involving number sense, students check their work to ensure the accuracy and reasonableness of solutions.</p>
<p><i>Students are expected to:</i>  <b>7. Look for and make use of structure.</b></p>	<p>Mathematically proficient students in Grade 2 carefully look for patterns and structures in the number system and other areas of mathematics. While solving addition and subtraction problems students can apply the patterns of the number system to skip count by 10s off the decade. For example, Grade 2 students are expected to mentally reason that <math>33 + 21</math> is 33 plus 2 tens, which equals 53 and</p>

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	<p>then an addition one which equals 54. 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. Further, Grade 2 students also make use of structure when they work with subtraction as missing addend problems, such as <math>50 - 33 = \underline{\quad}</math> can be written as <math>33 + \underline{\quad} = 50</math> and can be thought of as how much more do I need to add to 33 to get to 50?</p>
<p><i>Students are expected to:</i>  <b>8. Look for and express regularity in repeated reasoning.</b></p>	<p>Mathematically proficient students in Grade 2 begin to look for regularity in problem structures when solving mathematical tasks. For example, after solving two digit addition problems by decomposing numbers by place (<math>33 + 25 = 30 + 20 + 3 + 5</math>), 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, Grade 2 students accurately check for the reasonableness of their solutions during, and after completing the task.</p>

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**Organization of the Pre-Kindergarten to Grade 8 Content Standards in the 2017 framework**

The Pre-Kindergarten through Grade 8 content standards are organized by **grade level**. Within each grade level, standards are grouped first by **domain**, and then are further subdivided into **clusters** of related standards.

- **Standards** define what students should understand and be able to do.
- **Clusters** are groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject.
- **Domains** are larger groups of related standards. Standards from different domains may sometimes be closely related.

The table below shows which domains are addressed at each grade level from Prekindergarten through Grade 8. When the domain ends, it is expected that students will show mastery of that content by the end of that grade (i.e., Students should mastery in Counting and Cardinality by the end of Kindergarten).

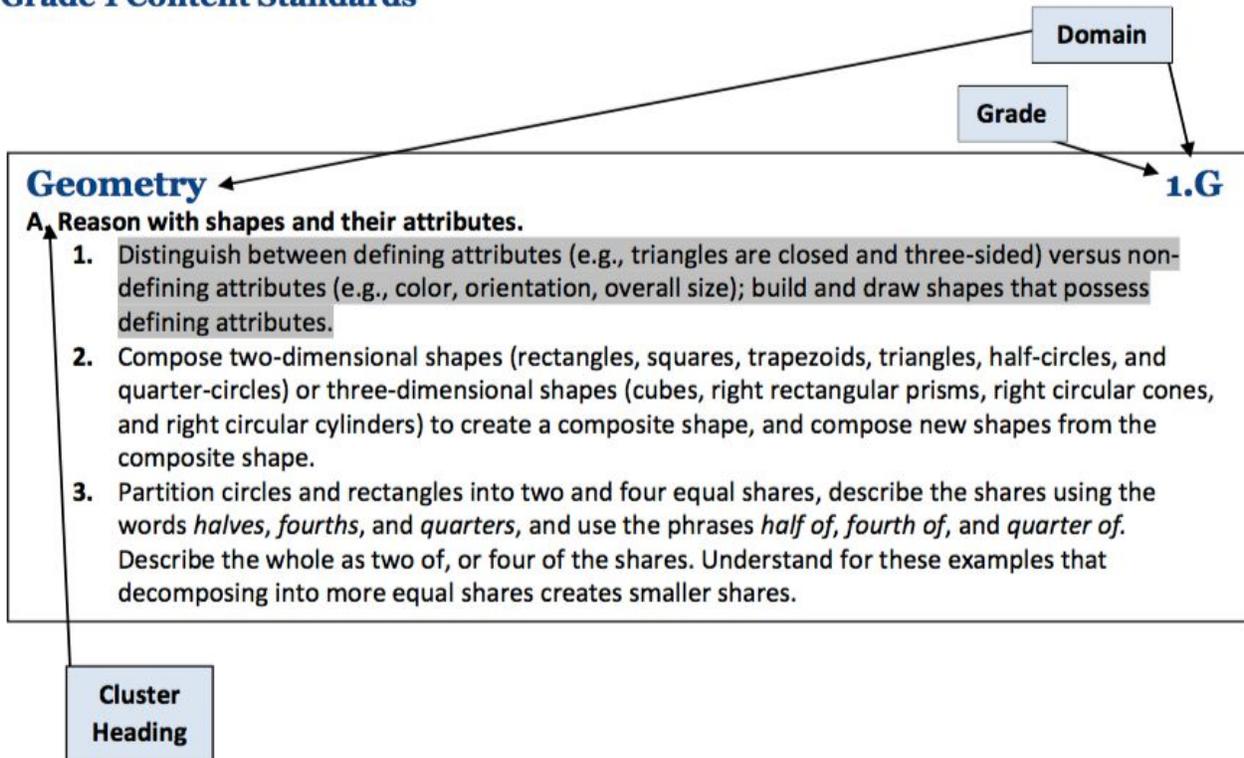
<b>Progression of Pre-K - 8 Domains</b>										
<b>Domain</b>	<b>Grade Level</b>									
	PK	K	1	2	3	4	5	6	7	8
Counting and Cardinality										
Operations and Algebraic Thinking										
Operations and Algebraic Thinking										
Number and Operations – Fractions										
The Number System										
Ratios and Proportional Relationships										
Expressions and Equations										
Functions										
Measurement and Data										
Geometry										
Statistics and Probability										

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**Standards Identifiers/Coding**

Each standard has a unique identifier that consists of the grade level, (PK, K, 1, 2, 3, 4, 5, 6, 7, or 8), the domain code, and the standard number, as shown in the example below. The standard below is identified as **1.G.A.1**, identifying it as a grade 1 standard in the Geometry Domain, and as the first standard in that domain. Standard 1.G.A.1 is the first standard in his cluster of standards.

**Grade 1 Content Standards**



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**Unit 1: Chapters 1 and 2**  
**September 5 - October 16**

**Assessments:**  
**FAST Screener - aMath 9/5 - 10/20**  
**Unit 1 Common Assessment by 10/16 (Optional)**

**Data Meeting/Reteach/Extend- 10/17 - 10/23**

**Chapter 1: Numbers to 1,000**

*September 5 – September 22 (13 days)*

***Chapter Notes:***

- Chapter 1 is extremely important. You will jump into large numbers quickly with your students. Students will be expected to read, write and work with numbers to 1,000. They will be ordering and comparing numbers and identifying number patterns.
- Use Grade 1, Chapter 2: Number Bonds as intervention based on the preassessment.
- Suggested Five Minute Warmup for this chapter : Stress decomposition of numbers to 10. For example, “I have 3 cubes. How many more do I need to have 10?” It’s likely that students will need practice and review with math facts up to 10, both addition and subtraction.
- Use Math In Focus Achieving Fact Fluency or other resources to teach fluency with number combinations within 20.

***Standards:***

**2.NBT.A.1** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

**2.NBT.A.1a** 100 can be thought of as a bundle of ten tens — called a “hundred.”

**2.NBT.A.1b** The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

***Scope of Standard:***

- Understanding that 10 ones make 1 ten and that 10 tens make 1 hundred is fundamental to students’ mathematical development. In first grade, students have many experiences with counting and “bundling” groups of tens . In second grade, students build on that understanding by making bundles of 100s with or without leftovers using base ten blocks, cubes in towers of 10, ten frames, etc. This emphasis on bundling hundreds will support students’ discovery of place value patterns.
- As students represent various amounts, they explore the big idea that all numbers can be expressed in a

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variety of equivalent ways. 243, for example can be expressed as: 2 groups of hundreds, 4 groups of ten, and 3 ones; 24 tens and 3 ones; 2 hundreds, 3 tens, and 13 ones, etc. This will be an essential connection to support subtraction with regrouping in Chapter 3. When students read numbers, they should read in standard form as well as using place value concepts. For example, 243 should be read as “two hundred forty-three” as well as two hundreds, 4 tens, 3 ones.

**2.NBT.A.3** Read and write numbers to 1,000 using base-ten numerals, number names, and expanded form.

*Scope of Standard:*

- Students need many opportunities reading and writing numerals in multiple ways. Students should be fluent in reading and writing numbers in standard form, written form, and using expanded notation. When students say the expanded form, it may sound like this: “6 hundreds plus 3 tens plus 7 ones” OR 600 plus 30 plus 7.”

**2.NBT.A.4** Compare two threedigit numbers based on meanings of the hundreds, tens, and ones digits, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparisons. Scope of the Standard:

- In addition to using written numbers, students use concrete models, pictures and/or words to represent three-digit numbers. To compare, students apply their understanding of place value. They first attend to the numeral in the hundreds place, then the numeral in tens place, then, if necessary, to the numeral in the ones place.
- Comparative language includes but is not limited to: more than, less than, greater than, most, greatest, least, same as, equal to and not equal to. Students use the appropriate symbols to record comparisons.

**2.MD.B.6** Represent whole numbers as length from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2 ..., and represent whole-number sums and differences within 100 on a number line diagram.

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**Chapter 2: Addition Up to 1,000**

*September 25 – October 16 (15 days)*

**Chapter Notes:**

- In order to meet Common Core Standards for Grade 2, instruction in addition and subtraction needs to focus on developing students' understanding of place value, properties of operations, and the relationship between addition and subtraction. Students apply these understandings to a variety of addition and subtraction strategies and develop the ability to choose efficient strategies based on the numbers in any given problem.
- This chapter focuses on the U.S. standard addition algorithm. To fully address 2.NBT.B.5, 6, and 7, it is necessary to include the broad range of strategies referenced in the Standards (see important Note under 2.NBT.B.7, below).
- Continue to work on fact fluency for addition and subtraction facts.
- Chapters 1 and 2 are critical chapters. In second grade, students are expected to master addition and subtraction within 100. They are also expected to be able to fluently add and subtract two digit numbers (see 2.NBT.B.5).
- Concrete models (e.g., base ten blocks) and/or drawings are essential to understanding how to add and subtract with three digit numbers. Be sure to have concrete models and place value mats available for all students anytime they are adding three digit numbers.
- Mastery of the U.S. standard addition algorithm is a Grade 4 standard.

**Standards:**

**2.NBT.B.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

*Scope of Standard:*

- Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. Students should have experiences solving problems written both horizontally and vertically. They need to communicate their thinking and be able to justify their strategies both orally and with paper and pencil.
- Students should know and use the commutative property of addition (Chapter 3, Grade 1), the associative property of addition (Chapter 2, Gr. 1), and the identity property of 0. Students do not need to know their formal names. Students in second grade need to communicate their understanding of why addition is commutative and subtraction is not.

**2.NBT.B.6** Add up to four two-digit numbers using strategies based on place value and properties of operations.

*Scope of Standard:*

- Students demonstrate addition strategies with up to four two-digit numbers either with or without regrouping. Problems may be written in a story problem format to help develop a stronger

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understanding of larger numbers and their values.

**2.NBT.B.7** Add and subtract within 1,000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

*Scope of Standard:*

- The addition strategies that fall under the categories in 2.NBT.7 include multiple ways of adding by place value, breaking numbers apart in different ways, creating easier equivalent equations, and changing numbers and compensating. MP.1 requires us to help students develop the ability to choose efficient strategies based on the numbers in a given problem.
- The MA Framework stresses the importance of using concrete models, drawings, and strategies based on place value to perform and understand addition or subtraction.
- There is a strong connection between this standard and place value understanding with addition and subtraction of smaller numbers. Students may use concrete models or drawings to support their addition or subtraction of larger numbers. Strategies are similar to those stated in 2.NBT.5, as students extend their learning to include greater place values moving from tens to hundreds to thousands.

**2.NBT.B.9** Explain why addition and subtraction strategies work, using place value and the properties of operations. (*Explanations may be supported by drawings or objects.*)

*Scope of Standard:*

- Students need multiple opportunities to explain their addition and subtraction thinking. Operations embedded within a meaningful context promote development of reasoning and justification.
- Students should be able to connect different representations and explain the connections. Representations can include numbers, words (including mathematical language), pictures, number lines, and/or physical objects. Students should be able to use any/all of these representations as needed.

**2.MD.B.6** Represent whole numbers as length from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2 ..., and represent whole number sums and differences within 100 on a number line diagram.

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**Unit 2: Chapter 3 and 4**  
**October 24 - December 6**

**Assessments:**  
**Unit 2 Common Assessment by 12/6 (Optional)**  
**Common Interim Assessment by 12/22**

**Data Meeting/Reteach/Extend- 12/7 - 12/13**

**Chapter 3: Subtraction Up To 1,000**

*October 24 – November 13 (14 days)*

*Chapter Notes:*

- In order to meet Common Core Standards for Grade 2, instruction in addition and subtraction needs to focus on developing students' understanding of place value, properties of operations, and the relationship between addition and subtraction. Students apply these understandings to a variety of addition and subtraction strategies and develop the ability to choose efficient strategies based on the numbers in any given problem.
- Chapter 3 focuses on the U.S. standard subtraction algorithm. To fully address 2.NBT.B.5, 6, and 7, it is necessary to include the broad range of strategies referenced in the Standards (*see Note under 2.NBT.B.7, below*).
- Concrete models (e.g., base ten blocks) and/or drawings are essential to understanding how to add and subtract with three-digit numbers. Be sure to have concrete models and place value mats available for all students anytime they are subtracting with three-digit numbers.
- Mastery of the U.S. standard subtraction algorithm is a Grade 4 standard.
- Students commonly make mistakes with subtraction and think that they can use the commutative property, like they do in addition:  $4 - 6 = 6$  4 is the misconception. To help students overcome this misconception stress MP.1, "learning to decide the reasonableness of an answer," and demonstrate with concrete models that subtraction is not commutative.

**Standards:**

**2.NBT.B.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

**2.NBT.B.6** Add up to four two-digit numbers using strategies based on place value and properties of operations.

*Note: This standard will be applicable in this chapter when students use addition as a strategy for checking subtraction calculations.*

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**2.NBT.B.7** Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose.

*Scope of Standard:*

- The subtraction strategies that fall under the categories in 2.NBT.7 include breaking numbers apart in different ways (including subtracting one number in parts and adding up in parts), creating easier equivalent equations, changing numbers and compensating, and place value strategies. MP.1 requires us to help students develop the ability to choose efficient strategies based on the numbers in a given problem.

**2.NBT.B.9** Explain why addition and subtraction strategies work, using place value and the properties of operations. (*Explanations may be supported by drawings or objects.*)

**2.MD.B.6** Represent whole numbers as length from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2 ..., and represent whole-number sums and differences within 100 on a number line diagram.

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**Chapter 4: Bar Models: Addition and Subtraction**

November 14 – December 6 (15 days)

**Chapter Notes:**

- Bar Models are introduced in Chapter 4. Although students will use many strategies solve problems, students are expected to learn to use bar models as a strategy to understand and represent mathematical situations. In order to help students with this new concept, make a habit of connecting bar models to number bonds in your instruction.
- Chapter 4 includes both part-part-whole word problems and additive comparison problems. The latter are more difficult. More practice will be provided in later chapters.
- Make a habit of using the language of “part-part-whole” throughout this chapter and moving forward. Students need to think about and practice identifying parts and wholes in a variety of addition and subtraction situations and equations.

**Standards:**

**2.OA.A.1** Use addition and subtraction within 100 to solve one and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (*see Table 1 at the end of this pacing guide*)

Scope of standard:

- The MA Framework includes two-step word problems and focuses on moving students toward more abstract representations of addition and subtraction.
- Four different addition and subtraction situations and their relationship to the position of the unknown are Take From, Add To, Compare, and Take From (see Table 1 at the end of this pacing guide). It is important to attend to the difficulty level of the problem situations in relation to the position of the unknown. Result Unknown, Total Unknown, and Both Addends Unknown problems are the least complex for students. The next level of difficulty includes Change Unknown, Addend Unknown, and Difference Unknown. The most difficult are Start Unknown and versions of Bigger and Smaller Unknown. Second graders should work on ALL problem types regardless of the level of difficulty. Mastery is expected in second grade.
- This standard focuses on developing an algebraic representation of a word problem through addition and subtraction – the intent is not to introduce traditional algorithms or rules.

**2.NBT.B.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

**2.NBT.B.6** Add up to four two-digit numbers using strategies based on place value and properties of operations.

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**2.NBT.B.7** Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose.

**2.NBT.B.9** Explain why addition and subtraction strategies work, using place value and the properties of operations. (*Explanations may be supported by drawings or objects.*)

**2.MD.B.6** Represent whole numbers as length from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2 ..., and represent whole-number sums and differences within 100 on a number line diagram.

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**Unit 3: Chapters 5, 6, & 10**  
**December 14 - January 26**

**Assessments:**  
**Common Interim Assessment by 12/22**  
**FAST Screener - aMath 1/2 - 1/26**  
**Unit 3 Common Assessment by 1/26 (Optional)**

**Data Meeting/Reteach/Extend- 1/29 - 2/2**

**Chapter 5: Multiplication and Division**

**Chapter 6: Multiplication Tables 2, 5, 10**

*December 14 – January 4 (10 days)*

*Chapter Notes:*

- Chapters 5 and 6 address multiplication and division. Grade 2 Standards include concepts related to multiplication such as odd and even numbers, adding to find the number of items arranged in a rectangular array, and skip counting. However, the operations of multiplication and division are not introduced until Grade 3.
- Since Chapters 5 and 6 are being taught as one unit of study, omit Problem Solving, Chapter WrapUp, and Chapter Assessment in Chapter 5.
- In Chapter 5, omit Lesson 2 (How to Divide) and the division word problems from Lesson 3. Although division is not a Grade 2 Standard, you might consider using this lesson as a way to deepen your students' conceptual understanding of equal groups.
- The focus for Chapter 6 is to develop an understanding of multiplication and division of 2, 5, and 10; it is not about fact mastery.
  - The primary model used to represent multiplication is the Dot Paper array.
  - Students learn to use a known fact to derive an unknown one (if  $2 \times 2 = 4$ , then  $3 \times 2 =$  one more 2, or 6).
  - Skip counting by 2s, 5s, 10s is emphasized in this chapter. Counting by 2s supports the exploration of odd and even numbers; counting by 5s and 10s supports problem solving involving money.
  - **2.G.A.2** (count to find the number of squares in an array) is not covered in Math in Focus. Chapter 6 provides an opportunity to make a connection between this idea and the Dot Paper array model for multiplication. Use Investigations, Unit 2, Session 2.4 as a way to make a

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connection between Dot Paper arrays and the rows and columns of square tiles that can be used to form a rectangle.

Standards:

**2.OA.C.3** Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends

*Scope of Standard:*

- Students explore odd and even numbers as pairs and as equal groups with or without leftovers. Use Investigations, Unit 3, Lessons 3.1 and 3.2)

**2.OA.C.4** 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 the total as a sum of equal addends.

*Scope of Standard:*

- Students use repeated addition and write equations such as  $5 + 5 + 5 + 5 + 5 = 25$  for arrays up to  $5 \times 5$ .
- Students may use any objects to make a rectangular array. Geoboards can also be used to demonstrate rectangular arrays. Students then write equations that represent the total as the sum of equal addends.

**2.G.A.2** Partition a rectangle into rows and columns of same-size squares and count to find the total number.

*Scope of standard:*

- This standard is a precursor to learning about the area of a rectangle and using arrays for multiplication. An interactive whiteboard or manipulatives such as square tiles, cubes, or other square shaped objects can be used to help students partition rectangles.

**2.NBT.A.2** Count within 1,000; skip-count by 5s, 10s, and 100s.

*Scope of Standard:*

- Students need many opportunities counting within 1,000 from different starting points and skip counting by 5s, 10s, and 100s. For skip counting by tens and hundreds, it is important to include starting points that are and are not multiples of 10 and 100 (e.g., count by 10s starting from 20, count by 10s starting from 4, count by 100s starting at 300, count by 100s starting at 117, etc.). The goal for second graders is to be able to count in multiple ways with no visual support.

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**Chapter 10: Mental Math and Estimation**

*January 5 – January 26 (15 days)*

**Chapter Notes:**

- Chapter 8 and Chapter 9 contain material Common Core Standards. As a result, they can be omitted from instruction. Note that Chapters 8 and 9 provide practice with addition and subtraction. Although you are skipping these chapters at this time, you may want to provide additional practice with addition, subtraction, and bar models.
- Skills and concepts within Chapter 10 should be reinforced all year.
- The focus of Chapter 10 is to enable students to become more flexible and efficient with their thinking. Students do not need to master all strategies presented.

Standards:

**2.OA.A.1** Use addition and subtraction within 100 to solve one and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. *(see Table 1 at the end of this pacing guide)*

**2.OA.B.2** Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers. By the end of Grade 2, know from memory related subtraction facts of sums of two one-digit numbers

*Scope of standard:*

- This standard focuses on students being able to fluently add and subtract numbers to 20. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently.
- Mental strategies help students make sense of number relationships as they are adding and subtracting within 20. The ability to calculate mentally with efficiency is very important for all students. Mental strategies may include counting on, making tens, decomposing a number leading to a ten, fact families, doubles, and near doubles (doubles plus or minus one or two). The use of objects, diagrams, interactive whiteboards, and various strategies will help students develop fluency.

**2.NBT.B.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

**2.NBT.B.6** Add up to four two-digit numbers using strategies based on place value and properties of operations.

**2.NBT.B.7** Add and subtract within 1000, using concrete models or drawings and strategies based on place

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value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or

**2.NBT.B.8** Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900. *(new expectation in the 2011 framework)*

*Scope of Standard:*

- Students need many opportunities to practice mental math by adding and subtracting multiples of 10 and 100 up to 900 using different starting points. They can practice this by counting and thinking aloud, finding missing numbers in a sequence, and finding missing numbers on a number line or hundreds chart. Explorations should include looking for relevant patterns. Mental math strategies may include counting on and counting back.

**2.NBT.B.9** Explain why addition and subtraction strategies work, using place value and the properties of operations. *( Explanations may be supported by drawings or objects. )*

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**Unit 4: Chapters 7 & 13**  
**February 5 - March 13**

**Assessments: Common Interim Assessments by 3/30**  
**Unit 4 Common Assessment by 3/13 (Optional)**

**Data Meeting/Reteach/Extend- 3/14- 3/20**

**Chapter 7: Metric Measurement of Length**

*February 5 – February 26 (11 days)*

**Chapter Notes:**

- Although the standards below refer to both metric and customary (U.S.) measurement, work in this chapter only includes metric measurement. Customary measurement is covered in Chapter 13.
- In addition to working with metric measurement, Chapter 7 provides for a meaningful way for students to continue to work with addition and subtraction, along with bar models.

Standards:

**2.MD.A.1** Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

*Scope of Standard:*

- Students in second grade will build upon what they learned in first grade from measuring length with nonstandard units to the new skill of measuring length in metric and U.S. Customary with standard units of measure . They should have many experiences measuring the length of objects with rulers, yardsticks, meter sticks, and tape measures. They will need to be taught how to actually use a ruler appropriately to measure the length of an object especially as to where to begin the measuring. Quickly move students from on-standard to standard measures.

**2.MD.A.3** Estimate lengths using units of inches, feet, centimeters, and meters.

*Scope of Standard:*

- Estimation helps develop familiarity with the specific unit of measure being used. To measure the length of a shoe, knowledge of an inch or a centimeter is important so that one can approximate the length in inches or centimeters. Students should begin practicing estimation with items that are familiar to them (length of desk, pencil, favorite book, etc.). Some useful benchmarks for measurement are:
  - First joint to the tip of a thumb is about an inch
  - Length from your elbow to your wrist is about a foot

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- If your arm is held out perpendicular to your body, the length from your nose to the tip of your fingers is about a yard

**2.MD.A.4** Measure to determine how much longer one object is than another, expressing the length difference in

terms of a standard length unit.

*Scope of Standard:*

- Second graders should be familiar enough with inches, feet, yards, centimeters, and meters to be able to compare the differences in lengths of two objects. They can make direct comparisons by measuring the difference in length between two objects by laying them side by side and selecting an appropriate standard length unit of measure. Students should use comparative phrases such as “It is longer by 2 inches” or “It is shorter by 5 centimeters” to describe the difference between two objects. An interactive whiteboard or document camera may be used to help students develop and demonstrate their thinking.

**2.MD.B.5** Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

**2.MD.B.6** Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

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**Chapter 13: Customary Measurement of Length**

*February 27 – March 13 (11 days)*

**Chapter Notes:**

- Emphasis for Chapter 13 is on concrete models, building to pictorial and into abstract. The big ideas within this chapter are about measuring in feet and inches, comparing lengths, and solving problems regarding length.
- Although the standards below refer to both metric and customary (U.S.) measurement, work in this chapter only includes customary measurement. Metric measurement was previously covered in Chapter 7.

Standards:

**2.MD.A.1** Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

**2.MD.A.2** Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

*Scope of the Standard:*

- Students need multiple opportunities to measure using different units of measure. They should not be limited to measuring within the same standard unit. Students should have access to tools, both U.S. Customary and metric. The more students work with a specific unit of measure, the better they become at choosing the appropriate tool when measuring.
- Students measure the length of the same object using different tools (ruler with inches, ruler with centimeters, a yardstick, or meter stick). This will help students learn which tool is more appropriate for measuring a given object. They describe the relationship between the size of the measurement unit and the number of units needed to measure something. For instance, a student might say, “The longer the unit, the fewer I need.” Multiple opportunities to explore provide the foundation for relating metric units to customary units, as well as relating within customary (inches to feet to yards) and within metric (centimeters to meters).

**2.MD.A.3** Estimate lengths using units of inches, feet, centimeters, and meters.

**2.MD.A.4** Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

**2.MD.B.5** Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

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**2.MD.B.6** Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

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**Chapters 11, 18, & 19**  
**March 21 - April 27**

**Assessments:**  
**Unit 5 Common Assessment by 4/27 (Optional)**

**Reteach/Extend- 4/30 - 5/4**

**Chapter 18: Lines and Surfaces**

**Chapter 19: Shapes and Patterns**

*March 21 – April 6 (12 days)*

***Chapter Notes:***

- **Lesson 2 covers content not in the 2 nd grade Common Core Standards. As a result, you can omit this lesson from instruction in this unit.**
- Chapter 18 focuses on recognizing, identifying and drawing parts of lines and curves. Students also are working on identifying and counting flat and curved surfaces.
- Recognizing, identifying and drawing plane shapes and recognizing and identifying solid shapes are important big ideas in Chapter 19.

***Standards:***

**2.G.A.1** Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. *(Sizes are compared directly or visually, not compared by measuring.)*

***Scope of standard:***

- Students should recognize and be able to draw triangles, quadrilaterals, pentagons, hexagons, and cubes. They should understand the attributes of each shape.
- Students are also expected to be able to identify and describe common two-dimensional and three-dimensional shapes specified in the Kindergarten and Grade 1 Standards (squares, circles, rectangles, trapezoids, cones, cylinders, spheres).

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**Chapter 11: Money**

*April 9 - April 27 (10 days)*

**Chapter Notes:**

- In Chapter 11, the dollar to cent conversions may be challenging for your students. The students need to have experience with conversions in order to further develop their understanding of equivalency. You do not need to expect mastery of these conversion problems. In addition, some students may struggle to identify the pictures of coins. Use actual coins whenever possible and spend time reviewing number bonds.
- Use materials from Grade 1, Chapter 19: Money ( Coin Identification ) as intervention based on the preassessment.

**Standards:**

**2.MD.C.8** Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. *Example: If you have 2 dimes and 3 pennies, how many cents do you have?*

*Scope of standard:*

- Students should have multiple opportunities to identify, count, recognize, and use coins and bills in and out of context. They should also experience making equivalent amounts using both coins and bills. “Dollar bills” should include denominations up to one hundred (\$1.00, \$5.00, \$10.00, \$20.00, \$100.00).
- Students should solve story problems connecting the different representations. These representations may include objects, pictures, charts, tables, words, and/or numbers. Students should communicate their mathematical thinking and justify their answers.

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**Chapters 12, 14, & 17**  
**May 7 - June 6**

**Assessments:**  
**FAST Screener - aMath 5/21 - 6/8**

**Reteach/Extend- 6/7 - 6/13**

**Chapter 12: Fractions**

*May 7 – May 16 (8 days)*

***Chapter Notes:***

- Chapter 12 is important, especially Lessons 1 and 2. Note that this fraction chapter goes into a greater depth of understanding than is required by the Common Core Standards. If you are students are engaged and ready for more, consider using Lesson 3 as well.
- The focus is on dividing circles and rectangles into equal parts and labeling the fractional parts. Add an example in which the equal parts are not the same shape.

**2.G.A.3** Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

*Scope of standard:*

- The MA Framework focuses on quarters, thirds and halves in concrete models.
- This standard introduces fractions in an area model. Students need experiences with different sizes, circles, and rectangles. For example, students should recognize that when they cut a circle into three equal pieces, each piece would equal one third of its original whole. In this case, students should describe the whole as three thirds.
- Students should see circles and rectangles partitioned in multiple ways so they learn to recognize that equal shares can be different shapes within the same whole.

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**Chapter 14: Time**

*May 17 - May 23 (5 days)*

**Chapter Notes:**

- Big ideas for Chapter 14 are about telling time to the nearest 5 minutes, reading and writing time, and knowing the difference between AM and PM.
- Elapsed time, introduced in this chapter, is beyond the CCSS for grade 2.
- MA.2.MD.7a, knowing the relationships of time, is not included in Math In Focus. Supplemental resources are needed. Consider using classroom routines to address this Standard.

Standards:

**2.MD.C.7** Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

**MA.2.MD.C.7a** Know the relationships of time, including seconds in a minute; minutes in an hour; hours in a day; days in a week, month, or year; weeks in month or a year.

*Scope of standard:*

- The MA Framework asks students to tell time to the nearest 5 minutes and be able to write the time in digital format. The additional Massachusetts specific standard requires knowing conversions related to time.
- In first grade, students learned to tell time to the nearest hour and half-hour. Students build on this understanding in second grade by skip-counting by 5 to recognize 5minute intervals on the clock. They need exposure to both digital and analog clocks. It is important that they can recognize time in both formats and communicate their understanding of time using both numbers and language. Common time phrases include the following: quarter till \_\_\_\_, quarter after \_\_\_\_, ten till \_\_\_\_, ten after \_\_\_\_, and half past \_\_\_\_.
- Students should understand that there are 2 cycles of 12 hours in a day a.m. and p.m. Recording their daily actions in a journal would be helpful for making real-world connections and understanding the difference between these two cycles.

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**Chapter 15 and 16 go beyond the Common Core Standards for Grade 2. Omit those chapters and continue instruction with Chapter 17.**

**Chapter 17: Graphs and Line Plots**

*May 24 - June 6 (9 days)*

**Chapter Notes:**

- Chapter 17 includes graphs with scales greater than one; this goes beyond the Common Core Standards for Grade 2.

Standards:

**2.MD.D.9** Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

*Scope of Standard:*

- This standard emphasizes representing data using a line plot. Students will use the measurement skills learned in earlier standards to measure objects. Line plots are first introduced in this grade level. A line plot can be thought of as plotting data on a number line.

**2.MD.D.10** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

*Scope of Standard:*

- Students should draw both picture and bar graphs representing data that can be sorted into up to four categories using single unit scales (e.g., scales should count by ones). The data should be used to solve put together, take-apart, and compare problems as listed in Table 1 at the end of this pacing guide .
- In Grade 2, picture graphs (pictographs) include symbols that represent single units. Picture graphs should include a title, categories, category labels, key, and data.
- Second graders should draw both horizontal and vertical bar graphs. Bar graphs include a title, scale, scale label, categories, category label, and data.

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**TABLE 1.** Common addition and subtraction situations.<sup>1</sup>

	<b>Result Unknown</b>	<b>Change Unknown</b>	<b>Start Unknown</b>
<b>Add to</b>	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? $2 + 3 = ?$	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? $2 + ? = 5$	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then they were five bunnies. How many bunnies were on the grass before? $? + 3 = 5$
<b>Take from</b>	Five apples were on the table. I ate two apples. How many apples are on the table now? $5 - 2 = ?$	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? $5 - ? = 3$	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? $? - 2 = 3$

	<b>Total Unknown</b>	<b>Addend Unknown</b>	<b>Both Addends Unknown<sup>2</sup></b>
<b>Put Together/ Take Apart<sup>3</sup></b>	Three red apples and two green apples are on the table. How many apples are on the table? $3 + 2 = ?$	Five apples are on the table. Three are red and the rest are green. How many apples are green? $3 + ? = 5, 5 - 3 = ?$	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? $5 = 0 + 5, 5 = 5 + 0$ $5 = 1 + 4, 5 = 4 + 1$ $5 = 2 + 3, 5 = 3 + 2$

<sup>1</sup> Adapted from Boxes 2-4 of Mathematics Learning in Early Childhood, National Research Council (2009, pp. 32-33).

<sup>2</sup> These take apart situations can be used to show all the decomposition of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean *makes* or *results in* but always does mean *is the same number as*.

<sup>3</sup> Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for small numbers less than or equal to 10.

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	Difference Unknown	Bigger Unknown	Smaller Unknown
<b>Compare</b> <sup>4</sup>	<p><i>("How many more?" version):</i> Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy?</p> <p><i>("How many fewer?" version):</i> Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie?</p> <p style="text-align: center;"><math>2 + ? = 5, 5 - 2 = ?</math></p>	<p><i>(Version with "more"):</i> Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have?</p> <p><i>(Version with "fewer"):</i> Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have?</p> <p style="text-align: center;"><math>2 + 3 = ?, 3 + 2 = ?</math></p>	<p><i>(Version with "more"):</i> Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have?</p> <p><i>(Version with "fewer"):</i> Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have?</p> <p style="text-align: center;"><math>5 - 3 = ?, ? + 3 = 5</math></p>

**TABLE 2. Subtraction Facts Cards**

The Subtraction Fact Cards can be found in the Investigations and the Common Core State Standards Teachers Guide (CCSS). Children cut them out and can add clues (optional). They then place them in 1 of 2 envelopes marked Facts I Know and Facts I Am Working On. This is a great assessment tool for Math Workshop and students can work on them with a partner. Facts I Know are mental facts or fast facts. Help students determine what are the facts that they need to work on. These facts should be practiced daily or weekly in class and for some students at home also.

Set	Math Unit	Facts	Pages (CCSS)
1	2	Plus 1	C2, 3
2	2	Plus 2	C4, 5
3	2	Make 10	C6
4	3	Doubles	C25
5	4	Near Doubles	C38, 39
6	5	Plus 10	C48, 49
7	9	Remaining Facts	C110-114

<sup>4</sup> For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.