2017-2018

Mathematics: Grade 1

Introduction

In Kindergarten, students learned to count in order, count to find out "how many", and model addition and subtraction situations with small sets of objects. Students identified and described geometric shapes, as well as created and composed shapes. In Grade 1, students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They develop an understanding of the relationship between addition and subtraction and develop efficient strategies for adding, subtracting, and comparing within 100. The measurement focus at this grade level is on iterating and transitivity; the geometric focus is on composition and decomposition of shapes, and comparing various attributes of shapes. In Grade 1, students build on the previous year's experience with small numbers to introduce the concept of a "ten" as a bundle of ones and to familiarize students with mathematical symbols for comparison. As the year progresses, they begin to think of whole numbers in terms of tens and ones. Students develop understanding of strategies for addition and subtraction within 20. Students generalize their methods to add within 100 using concrete models and drawings, demonstrating fluency with addition and subtraction within 10 by the end of the year. To further their understanding of properties of geometric shapes, students compose and decompose figures and build understanding of part-whole relationships. The three geometry units in this sequence of units provide time throughout the year for students to develop vocabulary and conceptual understanding that they can use to reason about shapes and their attributes. Students develop understanding of linear measurement and understand that length is measured in equal-size units. They also compare lengths indirectly.

Critical Areas of Instruction for First Grade

Critical Area 1: Developing understanding of addition, subtraction, and strategies for addition and subtraction within 20. Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They use a variety of models, including discrete objects and length-based models (e.g., cubes connected to form lengths), to model add-to, take-from, put-together, take-apart, and compare situations to develop meaning for the operations of addition and subtraction, and to develop strategies to solve arithmetic problems with these operations. Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties (e.g., "making tens") to solve addition and subtraction problems within 20. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.
Critical Area 2: Developing understanding of whole number relationships and place value, including grouping in tens and ones. Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.
Critical Area 3: Developing understanding of linear measurement and measuring lengths as iterating length units. Students develop an understanding of the meaning and processes of measurement, including underlying concepts such as iterating (the mental activity of building up the length of an object with equal-sized units) and the transitivity principle for indirect measurement.
Critical Area 4: Reasoning about attributes of, and composing and decomposing geometric shapes. Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

Please reference the California Mathematics Framework for elaboration on the standards, critical areas, major and supporting clusters, and instructional practices.

Connecting Standards for Mathematical Practice and Content

The Standards for Mathematical Practice apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations. The standards for Mathematical Practice (MP) represent a picture of what it looks like for students to ***do*** mathematics, and to the extent possible, content instruction should include attention to appropriate practice standards. There are ample opportunities for students to engage in each practice in First Grade; the table below offers some general examples of each practice in Grade 1.

Standards for Mathematical Practice	**Example:**
MP1. *Make sense of problems and persevere in solving them.*	In first grade, students realize that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Younger students may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, "Does this make sense?" They are willing to try other approaches.
MP2. *Reason abstractly and quantitatively.*	Younger students recognize that a number represents a specific quantity. They connect the quantity to written symbols. Quantitative reasoning entails creating a representation of a problem while attending to the meanings of the quantities. In first grade students make sense of quantities and relationships while solving tasks. They represent situations by decontextualizing tasks into numbers and symbols. For example, "There are 60 children on the playground and some children go to line up. If there are 20 children still playing, how many children lined up?" Students translate the situation into the equation: 60 – 20 = ___ and then solve the task. Students contextualize situations during the problem solving process. For example, students refer to the context of the task to determine they need to subtract 20 from 60 because the total number of children on the playground is the total number less the 20 that are still playing. Students might also reason about ways to partition two-dimensional geometric figures into halves and fourths.
MP3. *Construct viable arguments and critique the reasoning of others.*	First graders construct arguments using concrete referents, such as objects, pictures, drawings, and actions. They practice mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that that?' or "Explain your thinking," and "Why is that true?" They explain their own thinking and listen to the explanations of others. For example, "There are 15 books on the shelf. If you take some books off the shelf and there are 7 left, how many books did you take off the shelf?" Students might use a variety of strategies to solve the task and then share and discuss their problem solving strategies.
MP4. *Model with mathematics*	In early grades, students experiment with representing problems situations in multiple ways including numbers, words, mathematical language, drawing pictures, using objects, acting out, making a chart or list, and creating equations. Students need opportunities to connect the different representations and explain the connections. They should be able to use any of these representations as needed. First grade students model real-life mathematical situations with a number sentence or an equation and check to make sure equations accurately match representations while solving tasks and also write equations to model problem situations. For example, to solve the problem, "There are 11 bananas on the counter. If you eat 4 bananas, how many are left?' students could write the equation 11 – 4 = 7. Students also create a story context for an equation such as 13 – 7 = 6.

Standards for Mathematical Practice	Example:
MP5. *Use appropriate tools strategically.*	In first grade, students begin to consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, first graders decide it might be best to use colored chips to model an addition problem. In first grade, students use tools such as counters, place value (base ten) blocks, hundreds number boards, number lines, concrete geometric shapes (e.g. pattern blocks, 3-dimenstional solids), and virtual representations to support conceptual understanding and mathematical thinking. Students determine which tools are the most appropriate to use. For example, when solving 12 + 8 = ____, students explain why place value blocks are more appropriate than counters.
MP6. *Attend to precision.*	As young children begin to develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and when they explain own reasoning. In grade one, students use precise communication, calculation, and measurement skills. Students are able to describe their solutions strategies to mathematical tasks using grade-level appropriate vocabulary, precise explanations, and mathematical reasoning. When students measure objects iteratively (repetitively), they check their work to make sure there are no gaps or overlaps. Students regularly check their work to ensure the accuracy and reasonableness of solutions.
MP7. *Look for and make use of structure.*	First grade students look for patterns and structures in the number system and other others areas of mathematics. While solving addition problems, students begin to recognize the commutative property, for example 7 + 4 + 11 and 4 + 7 = 11. While decomposing two digit numbers, students realize that any two-digit number can be broken up into tens and ones, e.g. 35 = 30 + 5, 76 = 70 + 6. Grade one students make use of structure when they work with subtraction as a missing addend problem, such as 13 – 7 = ____ can be written as 7 + ____ = 13 and can be thought of as how much more do I need to add to 7 to get 13?
MP8. *Look for and express regularity in repeating reasoning.*	In the early grades, students notice repetitive actions in counting and computation. When children have multiple opportunities to add and subtract “ten” and multiples of “ten” they notice the pattern and gain a better understanding of place value. Students continually check their work by asking themselves, “Does this make sense?” Grade one students begin to look for regularity in problem structures when solving mathematical tasks. For example, students add three one-digit numbers using strategies such as “make a ten” or doubles. Students recognize when and how to use strategies to solve similar problems. For example, when evaluating 8 + 7 + 2, a student may say, “I know that 8 and 2 equals 10, then I add 7 to get to 17. It helps if I can make a 10 out of two numbers when I start.” Students use repeated reasoning while solving a task with multiple correct answers. For example, solve the problem, “There are 12 crayons in the box. Some are red and some are blue. How many of each could there be?” Students use repeated reasoning to find pairs of numbers that add up to 12 (e.g., the 12 crayons could include 6 of each color (6 + 6 + 12), or 7 of one color and 5 of another (7 + 5 = 12), etc.)

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First Grade Content Emphasis by Cluster (PARCC/SBAC)

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice. To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting materials will leave gaps in student skill and understandings and may leave students unprepared for the challenges of a later grade. The following table identifies the Major Clusters, Additional Clusters, and Supporting Clusters for this grade. Also, Achieve the Core's Coherence Map supports within and across grade level coherence.

Major Clusters (70%) Area of intensive focus where students need fluent understanding and application of the core.	**Supporting Clusters (20%)** Rethinking and linking areas where some material is being covered, but in a way that applies core understanding.	**Additional Clusters (10%)** Expose students to other subjects, though at a distinct level of depth and intensity.
Operations and Algebraic Thinking • Represent and solve problems involving addition and subtraction. • Understand and apply properties of operations and the relationship between addition and subtraction. • Add and subtract within 20. • Work with addition and subtraction equations. **Number and Operations in Base Ten** • Extend the counting sequence. • Understand place value. • Use place value understanding and properties of operations to add and subtract. **Measurement and Data** • Measure lengths indirectly and by iterating length units.	**Measurement and Data** • Represent and interpret data.	**Measurement and Data** • Tell and write time. **Geometry** • Reason with shapes and attributes.

Depth Opportunities: 1.OA.1, 1.OA.6; 1.NBT.2, 1.NBT.4; 1.MD.2

1st Grade Required Fluency –

- 1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent, but easier or known sums, by creating the known equivalent.

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FIRST GRADE SCOPE & SEQUENCE ~ YEAR AT A GLANCE				
Quarter	**Q1**	**Q2**	**Q3**	**Q4**
Big Ideas	**Exploring Addition & Subtraction**	**Continued Work with Addition & Subtraction, Place Value**	**Place Value, Operations with Bigger Numbers & Measurement**	**Working with Data & Exploring Geometry**
Domains	• Operations and Algebraic Thinking	• Operations and Algebraic Thinking • Numbers and Operations in Base Ten	• Operations and Algebraic Thinking • Numbers and Operations in Base Ten • Measurement & Data	• Measurement and Data • Geometry
Concepts	Addition and Subtraction Concepts (Ch. 1 & 2) **1.OA.1*, 1.OA.3*, 1.OA.6*, 1.OA.8** Addition Strategies (Ch. 3) **1.OA.2*, 1.OA.3*, 1.OA.5, 1.OA.6*** **Can Embed: 1.MD.4** AC Choice Option: Teach chapters in the following order: 1, 3, 2, 4. Emphasize and make connections to show how addition and subtraction relate to each other.	Subtraction Strategies (Ch. 4) **1.OA.1*, 1.OA.4, 1.OA.5, 1.OA.6*** Addition and Subtraction Relationships (Ch. 5) **1. OA.1*, 1.OA.6*, 1.OA.7, 1.OA.8*** **Can Embed: 1.MD.4** Count and Model Numbers (Ch. 6) **1.NBT.1, 1.NBT.2*, 1.NBT.2a*, 1.NBT.2b*, 1.NBT.2c***	Compare Numbers (Ch. 7) **1.NBT.3, 1.NBT.5** Two-Digit Addition and Subtraction (Ch. 8) **1.OA.6*, 1.NBT.4, 1.NBT.6** Measurement (Ch. 9) **1.MD.1, 1.MD.2, 1.MD.3**	Represent Data (Ch. 10) **1.MD.4** **This supports:** **1.OA.2*, 1.OA.6* 1.OA.8*** Two & Three-Dimensional Geometry (Ch. 11 & 12) **1.G.1, 1.G.2, 1.G.3** Getting Ready for 2nd Grade
Standards Assessed on Interim	**All Q1 Standards Listed Above Are Assessed On Interim 1**	**All Q2 Standards Listed Above Are Assessed On Interim 2 Along with Recursive Standards:** **1.OA.2*,1.OA.3***		
Additional HMH Tools & Resources	Found in Quarter 1 Planner	Found in Quarter 2 Planner	Found in Quarter 3 Planner	Found in Quarter 4 Planner
Common Assignment – HMH Performance Task	HMH Performance Task **Let's Help Chen Add!** Chapter 3 – Addition Strategies (1.OA.2, 1.OA.3, 1.OA.6)	HMH Performance Task **At the Block Party** Critical Area – Operations & Algebraic Thinking (1.OA.2, 1.OA.3, 1.OA.6, 1.OA.8)	HMH Performance Task **Lucy's Craft Store** Critical Area – Numbers & Operations in Base Ten (1.NBT.2a & c, 1.NBT.3, 1.NBT.4, 1.NBT.5)	HMH Performance Task **Max Takes Measurement** Critical Area – Measurement & Data (1.MD.1, 1.MD.2, 1.MD.3)

Key: Standards in Major Clusters | Standards in Supporting Clusters | Standards in Additional Clusters

*** Denotes a recursive standard**

Text Boxes provide suggestions for connections to build coherence across standards and further support the major clusters.