Welcome to Kindergarten - Math
Finding Our Way to First Grade - Math
Stepping up to Second Grade - Math

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PARCC Model Content Frameworks for Early Childhood Educators

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PARCC
Partnership for Assessment of Readiness for College and Careers

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Outcomes for the Session:

- Recognize the key components of the Model Content Frameworks
- Develop an awareness of key content represented in the grade-level evidence tables
- Develop a preliminary understanding of how to connect the Model Content Frameworks and the Standards/Grade-level evidences as a means to begin instructional planning for developmentally appropriate mathematical learning.

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Key Components of the PARCC Model Content Frameworks:

Focus	Coherence	Rigor
• Key advances • Content emphases by cluster • In-depth focus	• Within-grade dependencies • Connections among standards, clusters, or domains • Connecting major and supporting clusters	• Culminating standards or fluency expectations • Connecting practices and content

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Model Content Framework Content Emphases for Kindergarten

PARCC

Key: Major Clusters; Supporting Clusters; Additional Clusters

Counting and Cardinality
- Know number names and the count sequence.
- Count to tell the number of objects.

Operations and Algebraic Thinking
- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Number and Operations in Base Ten
- Work with numbers 11–19 to gain foundations for place value.

Measurement and Data
- Describe and compare measurable attributes.
- Classify objects and count the number of objects in categories.

Geometry
- Identify and describe shapes.
- Analyze, compare, create, and compose shapes.

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Model Content Framework Content Emphases for Grade 1

PARCC

Key: Major Clusters; Supporting Clusters; Additional Clusters

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.
- Tell and write time.
- Represent and interpret data.

Geometry
- Reason with shapes and their attributes.

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Model Content Framework Content Emphases for Grade 2

PARCC

Key: Major Clusters; Supporting Clusters; Additional Clusters

Operations and Algebraic Thinking
- Represent and solve problems involving addition and subtraction.
- Add and subtract within 20.
- Work with equal groups of objects to gain foundations for multiplication.

Number and Operations in Base Ten
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data
- Measure and estimate lengths in standard units.
- Relate addition and subtraction to length.
- Work with time and money.
- Represent and interpret data.

Geometry
- Reason with shapes and their attributes.

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Understanding the Evidence Document

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Connecting the Model Content Frameworks Chart to the Standards and Evidences

Each section of the MCF lists key ideas and opportunities to consider when designing instruction and assessment.

- Review the evidences in your grade.
- Review the MCF in your grade.
- As a group, describe how these tools might be used to support instructional planning for one or more standards/evidences and demonstrated by students as they engage in the various components of learning in a unit.
- Use the provided task as an example.

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Updates and more information

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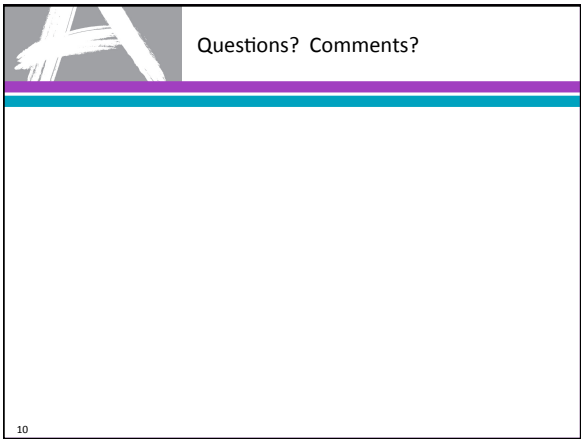
Sign up for the *PARCC Updates* newsletter


Questions? Comments?
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Following is a list of CCSSM content standards and clarifications to be the set around which the K-1 performance tasks and Grade 2 Diagnostic items are developed. The primary source used for deciding what to include on this list is the PARCC Model Content Framework for K-2. The list includes only standards that are contained in clusters listed as Major Clusters in that document. Many of these standards are also listed in each grade level's *Fluency Expectations or Examples of Culminating Standards* and/or *Opportunities For In-Depth Focus* sections.

A few notes about the intended use of these standards for K-1:

- Any tasks developed in this project will focus on one of the standards included here. And, while one of the standards from this list will be the *primary* focus of the performance tasks created during this project, any particular task could incorporate an additional standard which might not be included on this list.
- There are more standards on this list than there will be tasks produced. As such, there might be one or more standards from this list that do not become the focus of a task.

Kindergarten

K.CC.B.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks may have a context. ii) Tasks should include a range of counting exercises to answer "how many" objects in different arrangements progressing to the more difficult action of counting out a given number of objects. iii) Interviews (individual) should target students' abilities to meet this evidence statement.	MP.7	Count to tell the number of objects.

K.OA.A.5 Fluently add and subtract within 5.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks should provide students opportunities to demonstrate fluency for addition and subtraction within 5 and to apply different solution methods. ii) Interviews (individual) should target students' abilities to meet this evidence statement.	MP.5, MP.7	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical**	*CCSSM cluster heading*

	Practices	
i) Tasks should include the following problem situations: "Add To" and "Take From" – Result Unknown Problems, and "Put Together/Take Apart" – Total Unknown and Both Addends Unknown Problems (for more information see CCSS Table 1, p. 88 and OA Progression, p. 9.) ii) Interviews (individual or small group) are used to assess mastery of different problem types.	MP.1, MP.4	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from

K.OA.A.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g, by using objects or drawings, and record each decomposition by a drawing or equation.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks may have a context. ii) Tasks should include a range of activities that focus on decomposing numbers less than or equal to 10 into pairs in more than one way. iii) Tasks require students to record their thinking with a drawing or equation. iv) Interviews (individual) should target students' abilities to meet this evidence statement.	MP.1. MP.2	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from

K.OA.A.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks may have a context. ii) Tasks should focus on students' understanding of making 10 and representing their thinking. iii) Interviews (individual) should target students' abilities to meet this evidence statement.	MP.1, MP.2	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from

K.NBT.A.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks should focus on the understanding of numbers from 11 to 19 as composed of ten "ones" and some additional number of "ones." ii) Tasks should require students to record their thinking with a drawing or	MP.7, MP.8	Work with numbers 11-19 to gain

equation. iii) Interviews (individual) should target this understanding of composing and decomposing the teen numbers into ten "ones" and some additional number of "ones."		foundations for place value.

Grade 1

1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknown in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks should include all problem situations and all of their subtypes and language variants. Mastery is expected in "Add To" and "Take From" - Result and Change Unknown Problems, "Put Together/Take Apart" Problems, "Compare" – Difference Unknown, Bigger Unknown (more version) and Smaller Unknown (fewer version) Problems (for more information see CCSS Table 1, p. 88 and OA Progression, p. 9.) ii) Interviews (individual or small group) are used to assess mastery of different problem types.	MP.1, MP.4	Represent and solve problems involving addition and subtraction.

1.OA.A.2 Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings and equations with a symbol for the unknown number to represent the problem.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
Interviews (individual or small group) should target students' ability to solve word problems with 3 addends.	MP.1, MP.4	Represent and solve problems involving addition and subtraction.

1.OA.B.3 Apply properties of operations as strategies to add and subtract. Examples: if 8+3 = 11 is known, then 3+8 = 11 is also known. (Commutative property of addition.) to add 2+6+4, the second two number can be added to make a ten, so 2+6+4 = 2+10 = 12. (Associative property of addition)

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks should not expect students to know the names of the properties. ii) Interviews (individual or small group) should target students' application of properties of operations to add and subtract.	MP.7, MP.8	Understand and apply properties of operations and the relationship between addition and subtraction.

1.OA.D.7 Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8-1, 5+2=2+5, 4+1=5+2.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) ii) Interviews (individual) should target students' understanding of the equal sign.	MP.7, MP.8	Work with addition and subtraction equations.

1.OA.D.8 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8+?=11, 5=?-3, 6+6=?

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Interviews (individual) should target students' thinking strategies for determining the unknown in an addition or subtraction equation relating 3 whole numbers. Thinking strategies expected in Grade 1 (Level 2 and 3) are defined in 1.OA.6 and in OA Progression (p. 14-17.)	MP.7, MP.8	Work with addition and subtraction equations.

1.NBT.B.2 Understand that the two digits of a two-digit number represent amounts of tens and ones.

Evidence Statement Key	**Evidence Statement Text**	**Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks**	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
1.NBT.2-1	Understand that the two digits of a two-digit number represent amounts of tens and ones.	i) Tasks should focus on the understanding of two-digit numbers as some number of "tens" and some number of "ones." ii) Interviews (individual) should target this understanding.	MP.7, MP.8	Understand place value.
1.NBT.2-2	Understand that 10 can be thought of as a bundle of ten ones — called a "ten."	i) Tasks should focus on the understanding of ten "ones" as a unit of one "ten." ii) Interviews (individual) should target this understanding.	MP.7, MP.8	Understand place value.
1.NBT.2-3	Understand that the numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.	i) Tasks should focus on the understanding of numbers from 11 to 19 as composed of one "ten" and some number of "ones." ii) Interview (individual) should target this understanding.	MP.7, MP.8	Understand place value.
1.NBT.2-4	Understand that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).	i) Tasks should focus on the understanding of decade numbers as composed of some number of "tens" and 0 "ones." ii) Interviews (individual) should target this understanding.	MP.7, MP.8	Understand place value.

1.NBT.B.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, = and <.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks should focus on the understanding that the digit in the "tens" place is more important for determining the size of a two-digit number. ii) Interviews (individual or small group) should target this understanding	MP.1, MP.2	Understand place value.

1.NBT.C.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

Evidence Statement Key	**Evidence Statement Text**	**Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks**	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
1.NBT.4-1	Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used.	i)Tasks should focus on the connections among the students' concrete models/drawings, written numerical work, and explanations in terms of strategies/reasoning. ii) Interviews (individual) should target these connections	MP.3, MP.7	Use place value understanding and properties of operations to add and subtract.
1.NBT.4-2	Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.	i) Tasks should focus on the general method of adding tens and ones separately for finding the sum of any two-digit numbers. Composing a ten must be included in the range of tasks. ii)Interviews (individual or small group) should target understanding of this general method.	MP.7, MP.8	Use place value understanding and properties of operations to add and subtract.

1.NBT.C.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks should target not only the mental calculation but the reasoning used by the student. For example, students may explain their reasoning by saying that	MP3, MP.7	Use place value

they have one more or one less ten than before. Drawings and layered cards can be used to connect with place value and can be used in the explanation. ii) Interviews (individual) should target both the mental calculation and reasoning.		understanding and properties of operations to add and subtract.

1.NBT.C.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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 and explain the reasoning used.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks should focus on the connections among the computation, strategies used and the explanation of the reasoning. For example, students may explain their reasoning by representing 70 - 30 with base ten blocks. They may demonstrate and say that 7 tens minus 3 tens is equal to 4 tens using the blocks. Students may also use the relationship between addition and subtraction when they view 70 – 30 as an unknown addend addition problem and say that 30 + ? = 70. They reason that 4 tens must be added to 30 to make 70 so 70 – 30 = 40. ii) Interviews (individual) should target the connections among the computation, strategies, and reasoning.	MP.3, MP.7	Use place value understanding and properties of operations to add and subtract.

1.MD.A.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks should allow students to measure by laying physical units end-to-end. If students make procedural errors in measuring, they can be asked to tell in a precise way what the problem is, why it leads to incorrect measurements and how to fix it and measure more accurately. ii) Tasks should be written to include either standard or nonstandard units of measurement (e.g., inch cubes, centimeter cubes, standard rulers, or objects that are uniform in length such as paper clips, counters, toothpicks, pennies, links, or snap beads.) iii) Interviews (individual or small group) should target the actual measuring and the understanding that the length measurement of an object is the number of same-size length units that span the object with no gaps or overlaps.	MP.6, MP.8	Measure lengths indirectly and by iterating length units.

Grade 2

2.OA.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.

Evidence Statement Key	Evidence Statement Text	Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to Mathematical Practices	*CCSSM cluster heading*
2.OA.1-1	Use addition and subtraction within 100 to solve one- 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.	i) All problem situations and all of their subtypes and language variants are included but 40% of tasks should include the most difficult problem subtypes and language variants. ii) Addition and subtraction is emphasized beyond 20 but within 100 ii) For more information see CCSS Table 1, p. 88 and the OA Progression. .	MP.1, MP.4	Represent and solve problems involving addition and subtraction.
2.OA.1-2	Use addition and subtraction within 100 to solve 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.	i) The majority of problems (75%) involve single-digit addends. ii) The most difficult problem subtypes and language variants should not be included in these problems. iii) For more information see CCSS Table 1, p. 88 and the OA Progression.	MP.1, MP.4	Represent and solve problems involving addition and subtraction.

2.OA.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.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to Mathematical Practices	*CCSSM cluster heading*
i) Tasks do not have a context. ii) Only the answer is required (strategies, representations, etc. are not assessed here). iii) Tasks require fluent (fast and accurate) finding of sums and related differences.		Add and subtract within 20..

2.NBT.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:

A. 100 can be thought of as a bundle of ten tens — called a "hundred."

B. 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).

Evidence Statement Key	**Evidence Statement Text**	**Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks**	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
2.NBT.1a	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: 100 can be thought of as a bundle of ten tens — called a "hundred."	Tasks have "thin context" or no context.	MP.7, MP.8	Understand place value.
2.NBT.1b	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: 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).	Tasks have "thin context" or no context.	MP.7, MP.8	Understand place value.

2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Skip-counting may start at any multiple of 5, 10 or 100 within 1000.	MP.7, MP.8	Understand place value.

2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form..

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) At least 75% of the tasks involve a 3-digit number.	MP.7, MP.8	Understand place value.

2.NBT.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks do not have a context. ii) Only the answer is required (strategies, representations, etc. are not assessed here).	MP.7, MP.8	Understand place value.

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

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks do not have a context. i) Sums and differences beyond 20 but within 100 should be emphasized in 75% of the tasks. ii) Only the answer is required (strategies, representations, etc. are not assessed here).		Use place value understanding and properties of operations to add and subtract.

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

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Tasks do not have a context. ii) Only the answer is required (strategies, representations, etc. are not assessed here).	MP.7, MP.8	Use place value understanding and properties of operations to add and subtract.

2.NBT.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 tens or hundreds.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Emphasis is on adding and subtracting hundreds. Tasks do not have a context.	MP.7, MP.8	Use place value understanding and properties of operations to add and subtract.

2.NBT.8 Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
Tasks have "thin context" or no context.	MP.7, MP.8	Use place value understanding and properties of operations to add and subtract.

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

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
i) Length may be measured in whole units within the same measurement system using metric or U.S. customary. ii) Units are limited to those found in 2.MD.3.	MP.5	Measure and estimate lengths in standard units.

2.MD.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.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to Mathematical Practices	*CCSSM cluster heading*
i) Tasks should be limited to whole units within the same measurement system ii) Units are limited to those found in 2.MD.3 iii) Example: Student measures the length of a table in inches and in feet and notes that the number of feet is less than the number of inches because an inch is smaller than a foot. Therefore, it takes more inch units than foot units to measure the table's length.	MP.5	Measure and estimate lengths in standard units.

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

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to Mathematical Practices	*CCSSM cluster heading*
i) Rulers are not used to estimate.	MP.5, MP.6	Measure and estimate lengths in standard units.

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

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to Mathematical Practices	*CCSSM cluster heading*
i) Length may be measured in whole units within the same measurement system using metric or U.S. customary. Ii) Units are limited to those in 2.MD.3.	MP.5, MP.6	Measure and estimate lengths in standard units.

2.MD.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.

Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to Mathematical Practices	*CCSSM cluster heading*
i) Tasks may include measurements in whole units within the same measurement system.using metric or U.S. customary. ii) Problems may be one or two-step. iii) For one-step problems, all problem situations and all of their subtypes and language variants may be included but 50% of tasks should include the most difficult problem subtypes and language variants. iv) For two-step problems, the most difficult problem subtypes and language variants should not be included. The majority of the two-step problems involve single-digit addends. v) Subtraction and addition are emphasized beyond 20 but within 100. At	MP.1, MP.2, MP.4	Relate addition and subtraction to length.

least 75% of the tasks must focus on addition and subtraction greater than 20. For more information see CCSS Table 1, p. 88 and the OA Progression.		

2.MD.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.

Evidence Statement Key	**Evidence Statement Text**	**Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks**	**Relationship to Mathematical Practices**	*CCSSM cluster heading*
2.MD.6-1	Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, …,.	-	MP.5, MP.6	Relate addition and subtraction to length.
2.MD.6-2	Represent whole-number sums and differences within 100 on a number line diagram.	i) Subtraction and addition are emphasized beyond 20 but within 100. At least 75% of the tasks must focus on addition and subtraction greater than 20.	MP.5	Relate addition and subtraction to length.

A note about the Standards for Mathematical Practice (SMP) – Each of the tasks developed will inherently include opportunities for engagement in the SMP. These opportunities will be explicitly referenced within the task and the supporting materials.

Overview

Purpose	Formative assessment of students' understanding of place value and properties of operations used to add or subtract.
Grade Level(s)	1st Grade *This can also be used in 2nd grade, as activities are designed to assess mastery of 1st grade standards as well as progress toward mastery of 2nd grade standards.*
Task Format	• Whole group • Task will be repeated for up to five consecutive days (five to seven minutes per day) until all students have had the opportunity to participate and be assessed.
Materials Needed	• Overhead projector, interactive whiteboard • Base-10 blocks (overhead-friendly or virtual)
Prerequisite Concepts and Skills	• Counting by 1s to 120 • Counting by 10s to 100 • Demonstrating understanding of how to "count on" from a given number • See kindergarten "Counting and Cardinality" in the Common Core State Standards (K.CC) for these and related skills.

Standards Assessed

1.NBT.C.4	Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds 10s and 10s, 1s and 1s; and sometimes it is necessary to compose a 10.
1.NBT.C.5	Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.
1.NBT.C.6	Subtract multiples of 10 in the range of 10–90 (positive or zero differences), 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 and explain the reasoning used.
EXTENSIONS	
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.9	Explain why addition and subtraction strategies work, using place value and the properties of operations.
Note: This task does not cover every part of the standards listed above. For example, standard 1.NBT.C.4 covers problems like 37 + 25, but such problems are not covered in this task.	

Standards for Mathematical Practice Embedded in This Task

MP5	Use appropriate tools strategically. *The degree of need for MP5 in this task will vary according to the students' need to use tools to think through the activity. Base-10 blocks are one tool that can be used, but fingers may also be a common tool students might use for this activity. The goal is to see a decrease in the need for tools when figuring out this task, so it is hoped that tool use will decrease over time.*
MP8	Look for and express regularity in repeated reasoning. *MP8 is a foundational practice in this exercise. As students engage in the activity, the repeated opportunities to work with adding or subtracting 1s and 10s, as well as repeatedly adding 10 then subtracting 10, helps students to see patterns in the results. They can work toward generalizing results with the repetition, such as "any time I add 10, I increase the first number (the 10s) by one or if I add and then subtract the same number, I end up at the same number that I started with."*

Preparing for the Task

1. Set up an overhead projector or interactive whiteboard along with overhead-friendly Base-10 blocks (or virtual Base-10 block manipulatives).
2. Have a copy of the lists of preselected numbers (Days 1–5). Do not share this list with students.

Implementing the Task

Explain to students that the goal of this task is to become good at adding and subtracting 1s and 10s. To build students' engagement and keep this task playful, you can approach this like a game.

Students will add or subtract 1 or 10 from a number shown with Base-10 blocks and will continue using the result from one operation as the starting point for the next operation.

Throughout the document, when specific language is suggested, it is shown in blue text.

1. Find the appropriate day's starting number(s) and sequence(s) on pages 5–7. Announce, "Today, we're starting at ___." Read the *starting number* aloud to students. (For example, say, "Today we're starting at 25.")
2. Invite a student to model the *starting number* using Base-10 blocks on the overhead projector or whiteboard (e.g., 25 = two 10s + five 1s).
3. "Now I'll choose someone and I will say just '1 more' or maybe '1 less' or '10 more' or '10 less.' Your job will be to show the new number and say it out loud."

   Note: Keeping the words to a minimum is very important to the task. Students often make mistakes because they have to process several things at once; by minimizing the spoken language that students need to attend to, you are trying to singularly identify difficulties that arise because of mathematical misconceptions or errors, rather than those that might arise from processing.

4. Following the sequence of steps for the day, ask individual students to perform the specified addition or subtraction (of 1 or 10) to the existing number.

   For example, say, "[Student name], 10 more." The student will then add a rod to 25 and then say "35."

   The task continues *from that new number*, adding or subtracting another 1 or 10 until the sequence for that day is used up.

5. After a few rounds of students demonstrating the change and the resulting number on the overhead (or board), ask the students to respond in chorus to the next step in the sequence. You might say, "Now we are going to do this as a whole class, so after I say the change, you say the new number all together."

6. **Addressing Student Misconceptions/Errors.** When errors occur with modeling or reporting the answer, you might ask the student to "show why you think that's true" to uncover student thinking and gain further insight into what caused the error: misconception or just a slip. This is *not* a time for breaking into a lecture.

   The following situation illustrates this point:

   (The previous number is 37.)

   TEACHER: Michayla, add 10.
   MICHAYLA: 46.
   TEACHER: Show me why you think that is true.
   MICHAYLA: Okay … *(counts on fingers)* 37, 38, 39, 40, 41, 42, 43, 44, 45, 46.
   (The student's misconception arises from the fact that he or she includes the starting number when counting and does not count on.)
   TEACHER: What do the rest of you think?
   STUDENT B: I think it should be 47 'cause when you add 10, the 30 changes to 40, but the 7 stays.
   TEACHER: Great, let's keep going from 47. Jerome, add 1. *(This ought to help Michayla rethink the counting method. This is something to note about Michayla but to address at a later time.)*

   While in this early mode of a single student responding, if a different student happens to call out the correct answer, you might ask the student in front, "What do you think?" You might also say nothing and allow the student in front to make a decision about what to do. It's important at this point, however, not to allow this interaction to disrupt the flow of the activity.

   Once the activity is in choral-response mode, you may (on occasion) hear both correct and incorrect answers; it is not actually necessary in these cases to correct the response (but make note of it). When this occurs, you might say, "One of those is correct." Then choose a new starting number and complete the sequence (or restart if you deem appropriate, but stay in choral mode). Often, in hearing the other students' responses a student will self-correct in one or two steps. Note any significant student misconceptions on the rubric provided.

Assessing Student Understanding

As this activity unfolds, fill out the task rubric. The rubric serves two purposes: (1) to help determine each student's understanding and what the student is able to do independently; and (2) to inform next steps in each student's learning trajectory and plan next steps for instruction.

Illustrating the Task

TEACHER: Our starting number is 25. [Student name] please show us 25 using Base-10 blocks. *(Student A places two 10s and five 1s on the overhead projector.)*

TEACHER TO STUDENT A: How do you know that this is 25? *(Student A explains the reasoning used.)*

TEACHER: *(Selects a new student)* [Student name], add 10.

(Student B comes up to the overhead projector, places a ten rod and says, "35." Student may also write this number in numeral form.)

After the first three or four moves are represented with the Base-10 blocks, indicate to students that you are now going to challenge them by *not* modeling with the blocks for the whole class, although they are still allowed to use tools at their desk to help figure out the answers. Ask students to wait two beats before calling out their response. This game continues for four to five minutes until you have had the chance to assess several students on one or more series of numbers.

TASK: List of Numbers

This list of numbers and sequence has been carefully developed to help students use repeated reasoning over time to make generalizations. On Day 1, the task becomes increasingly complex, making sure students work effectively with 1s and then 10s and then interchanging them. For Day 2 and beyond, they continue the mixing of 1s and 10s but begin having students cross decades (20s, 30s, 40s, etc). When it seems reasonable for your class, ask students to begin to combine the adding and subtracting of 1s and 10s to assess whether they understand situations such as that adding 1 and 10 is 11 and whether adding 10 followed by subtracting 10 (or 1) leaves the number unchanged.

We hold off on working with units and teens until the last section of the task, since in spoken English, units and teens do not follow the same pattern as the higher decades. Consequently, working with these numbers requires more cognitive effort for students. So, despite the seemingly inherent simplicity of smaller numbers, it is important to delay the work with units and teens until Day 5. If evidence from your students' responses on previous sequences suggests that students are ready to move to this prior to Day 5, begin when you believe it is appropriate.

Day 1

Part 1: Adding/Subtracting 1s

Starting number: 23

Sequence:

1 more, 1 more, 1 more, 1 more,

1 more, 1 less, 1 more, 1 less,

1 less, 1 less, 1 less, 1 more,

1 less, 1 more, 1 less, 1 more

Part 2: Adding/Subtracting 10s

Starting number: 34

Sequence:

10 more, 10 more, 10 more, 10 more,

10 more, 10 less, 10 more, 10 less,

10 less, 10 less, 10 less, 10 less,

10 less, 10 more, 10 less, 10 more, 10 less

Part 3: Adding/Subtracting 1s and 10s

Starting number: 36

Sequence:

1 more, 1 less, 10 more, 10 more,

1 less, 10 less, 10 more, 10 more,

10 less, 10 more, 1 more, 1 less,

1 less, 1 more, 10 less

Days 2–4

Part 1: Crossing Decades

Starting number for Day 2: 47

Note: For Days 3 and 4, choose starting numbers that cause crossing over decades, such as 58, 37 or 77, avoiding units and teens.

Sequence:

1 more, 1 less, 1 more, 1 more,

1 less, 1 more, 1 more, 1 more,

10 more, 1 less, 1 less, 10 more,

1 more, 1 less, 1 less, 10 more,

1 less, 10 less, 10 less, 10 less,

10 less, 1 more, 1 more, 1 more

Part 2: Combining 1s and 10s

Starting number for first day: 65

Note: Depending on your students' understanding, this can begin as early as Day 2, but it may make sense to hold off until Day 3 or 4 if students need some more work with the single operations. For subsequent days, choose starting numbers that cross decades, but don't get into units, teens or negative numbers.

Sequence:

10 more, 10 less, 10 more, 1 more,

1 less, 1 more, 1 less, 10 less, 10 more and 1 more,

10 more and 1 more, 1 less and 10 less, 1 more and 1 more,

1 more and 1 more, 1 less and 1 less, 1 more and 1 less, 1 less and 1 more,

10 more and 10 less, 10 less and 10 more, 1 more and 10 less, 10 more and 1 less,

10 less and 1 more, 1 less and 10 more

Day 5

*Starting in Units***

Starting number: 3

Note: Repeat the activity starting with 2, and again beginning with 11.

Sequence:

10 more, 10 less, 1 more, 10 more,

1 more, 10 less, 1 less, 1 less,

1 less, 10 more, 10 less, 10 more,

1 more, 10 more, 10 more, 1 less, 1 more

****Note:*** In spoken English, units and teens do not follow the same pattern as the higher decades. Consequently, working with these numbers requires more cognitive effort for students. So, despite the seemingly inherent simplicity of smaller numbers, it is important to delay the work with units and teens until Day 5. If evidence from your students' responses on previous sequences suggests that students are ready to move to this prior to Day 5, begin when you believe it is appropriate.

Potential erroneous responses that might signify processing errors rather than mathematical misconceptions:

1. When crossing decades, students might do something like the following:
   - 62 [1 less] → 61 [1 less]→ 60 [1 less] → 69/59

     This is a typical error that results from students having to keep so many things in working memory at once; they know the 1s digit has to decrease by one, and they are working so hard to make sure that happens, they forget to decrease the 10s digit as well.

     If you hear both 59 and 69, tell students that one of those responses is correct (you don't have to say which one), and then redo the same sequence starting in another decade.
   - 72 [1 less] → 71 [1 less] → 70 [1 less] → 79/69

     On the next round, fewer students will make the error because when they hear the right answer in the previous round, they typically realize their mistake right away because it is generally not a misconception. If need be, you can do this process again.

Adding and Subtracting 1 and 10 Rubric

Overview: This rubric breaks down the "smaller understandings" that build toward *deep* understanding of the standards 1.NBT.4, 1.NBT.5 and 1.NBT.6. Recognizing these smaller understandings will allow you to identify where student misconception is happening along a continuum and plan next steps for instruction accordingly.

***Directions*:** This rubric is a checklist. Write in student names (or initials) when evidence is observed.

APPROACHING THE STANDARD		
Student(s) Comprehension ***Check all that apply***	**Scaffolding Learning**	**Follow-Up Questions** ***Please see note at end of the table***
❑ Student adds 1 correctly to any number *within* a decade (less than 100). Student demonstrates recognition that the number value *increases*. ❑ Student subtracts 1 from any number *within* a decade (starting less than 100). Student demonstrates recognition that the number value *decreases*. *Note: Numbers within a decade include value of numbers 0–9, 10–19, 20–29, 30–39, 40–49, 50–59, 60–69, 70–79, 80–89, 90–99.*	❑ Uses fingers for support. ❑ Uses manipulatives for support. Manipulative(s): _____ ❑ Requires additional teacher support. Explain below: _____ _____ ❑ Calculates mentally.	• Can student count on from any given number*?* • Can student record this equation in written form? *For example, if prompted, student is able to write the equation (35 – 1 = 34) to match the corresponding Base-10 model.**
❑ When adding 1 to a number like 29, 39, 49, etc., student reliably crosses the decade correctly (e.g., getting to 30, 40, 50). ❑ When subtracting 1 from a multiple of 10 (e.g., from 60, 70, 80), student reliably moves to the preceding decade (e.g., getting to 59, 69, 79, etc.).	❑ Uses fingers for support. ❑ Requires additional teacher support. Explain below: _____ _____ ❑ Calculates mentally.	• Does student understand how to count on to a higher decade? • Can student record this equation in written form? *For example, if prompted, student is able to write the equation (29 + 1=30) to match the corresponding Base-10 model.**

APPROACHING THE STANDARD		
Student(s) Comprehension ***Check all that apply***	**Scaffolding Learning**	**Follow-Up Questions** ***Please see note at end of the table***
❑ Student conceptually understands that when you add or subtract 1 or 10 from any number, you are *"doing"* something to the number to create a new number and further understands that when you perform the opposite action, subtracting or adding the same amount starting at that new number, you are *"undoing"* what was just done. That is, the sequences "start at 47, add 10, subtract 10" and "start at 47, subtract 10, add 10" both end where they started — at 47.	❑ Requires additional teacher support. Explain below: _____ _____ ❑ Calculates mentally.	• Is student able to generalize a "rule" to explain what is happening? *For example, "If I add 10 and then subtract 10, it is the same as adding or subtracting 0" or "it is as if nothing happened."**
❑ Student understands that when adding or subtracting 10, the "last name" of the number (the "9" in "39") remains the same, but the "first name" (the "30") changes. In written notation, student recognizes which place (10s) changes and which place (1s) remains the same.	❑ Uses fingers for support. ❑ Requires additional teacher support. Explain below: _____ _____ ❑ Calculates mentally.	• Can student record this equation in written form? *For example, if prompted, student is able to write the equation 83 – 10 = 73 to match the corresponding Base-10 model.**

MEETING THE STANDARD		
Student(s) Comprehension ***Check all that apply***	**Scaffolding Learning**	**Follow-Up Questions** ***Please see note at end of the table***
❑ Student is able to add and subtract 1 from any number within 100 fluently and consistently.	❑ Uses fingers for support. ❑ Uses manipulatives for support. ❑ Requires additional teacher support. Explain below: _____ _____ ❑ Calculates mentally.	
❑ Student is able to add and subtract 10 from any number within 100 fluently and consistently.	❑ Uses fingers for support. ❑ Uses manipulatives support (excluding Base-10 blocks). Manipulative(s): _____ ❑ Requires additional teacher support. Explain below: _____ _____ ❑ Calculates mentally.	
❑ Student is able to flexibly integrate adding and subtracting 1 and 10 from any number within 100.	❑ Uses fingers for support. ❑ Uses manipulatives support. ❑ Requires additional teacher support. Explain below: _____ _____ ❑ Calculates mentally.	• Is student able to perform these mental calculations when given only the two-digit number in written form?* • Can student move to the stage of writing an equation to match each mental calculation?*

MEETING THE STANDARD		
Student(s) Comprehension ***Check all that apply***	**Scaffolding Learning**	**Follow-Up Questions** ***Please see note at end of the table***
❑ Student makes connections between a series of steps and generalizes to explain what is happening. *For example, "If I add 10 and then add 1 to any number, it is the same as adding 11."**		Does student generalize the following rules?* • Add 10, add 1 → add 11 • Add 10, add 1, add 1 → add 12 • Add 10, subtract 1 → add 9 • Add 10, subtract 1, subtract 1 → add 8 • Subtract 1, subtract 1 → subtract 11 • Subtract 10, add 1 → subtract 9 • Other rules?

**Note:* These activities are not specifically called for in this task, but if deemed appropriate, could be implemented as follow-up questions with your students.

Overview

Purpose	The tasks are intended to formatively assess students' ability to put together and take apart numbers as well as their ability to apply mathematics to a context. Each situation is open ended, providing for multiple correct solutions.
Grade Level(s)	1st Grade
Task Format	• The opening task is worded as if designed for one-on-one assessment with a single student, but it also makes an excellent whole-class teaching activity, giving the teacher a good sense of the group and giving students a rich exchange of ideas in preparation for later tasks. With a group activity, one gets less specific information about the individuals, but the benefits may outweigh that relatively minor loss. • The second task also is a good group activity. The variety of responses that may spontaneously arise in a group is greater than a single individual is likely to produce, and this helps open up students to new ideas. • Later tasks can also be done as a whole group, giving a sense of where the students are, but it may be more useful to administer those to individuals or, at most, two students at a time.
Materials Needed	• Color copies of the pictures provided at the end of this document. The tasks are not nonverbal — both teacher and students will talk — but some of the situations are picture based to minimize effects of reading or auditory language processing dysfluencies.
Prerequisite Concepts and Skills	For key prerequisite skills and concepts, see kindergarten "Operations and Algebraic Thinking" (K.OA) in the Common Core State Standards.
This task belongs to the **major work** of the K–2 grade band. For more information, see the PARCC Model Content Frameworks for Mathematics.	

Standards Assessed

1.OA.A.1	Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
1.OA.A.2	Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Notes:

1. These tasks center on smaller numbers; there are no problems with numbers in the teens, such as 13 – 8 = 5. Standards 1.OA.A.1 and 1.OA.A.2 cover all single-digit sums and related differences.
2. This task does not directly assess or require fluency. By the end of 1st grade, students are expected to demonstrate fluency when adding and subtracting within 10 (see 1.OA.C.6).

Standards for Mathematical Practice Embedded in this Task

MP1	Make sense of problems and persevere in solving them.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP6	Attend to precision.

Recording Students' Work

On the following pages are observation points that are labeled A–CC. As the student(s) work through the task, record the letters that are applicable to that student. Add any extra notes you think would be useful for you to remember when working with the student or that you might want to recall when talking or writing to parents. One 3" × 5" card per student should be sufficient for these notes. A tablet computer with a camera (or similar device) could let you keep photos and audio recordings of the work, too.

Preparing for the Task

1. **Make the basic set of materials.** A color print of the pictures is included at the end of this document.
2. **Read the entire task set 1–5 before starting Task 1.** Each step in this task plays a role in the assessment. Reading the entire task will give you the big picture of what portions of the task are intended to assess which portions of the standards. It will also remind you how far to take each task to avoid circumventing one of the intermediate steps in the assessment.
3. **Treat the tasks as puzzles and teaching opportunities.** These tasks present challenges that tell you about a student's ability to make a mathematical connection to a context as well as the student's ability to put together and take apart a number. They do not predict whether the student will or will not be good at this kind of task in some long-term future. That future depends on chances to learn and stretch, and the tasks here can give you the kind of information that will let you stretch your students' thinking.

   To get the most useful information, you need to know what your students can do when they are thinking *about the task* and not distracted by thinking about *how well they are doing, how they might look* to you or *how they might compare* with other students.

For that reason, try to keep the student's experience as natural and playful as possible: You are a teacher, so you may teach, and your students are children, so they may *play* with the tasks and challenges or enjoy solving *puzzle*s. And as a teacher, try to keep your responses *informative* ("I see three strawberries" or "I wonder why there are more red fruits than green fruits.") rather than *evaluative* ("Very good!") or consoling without clarifying ("That's close; try again").

Implementing the Task

Throughout the document, when specific language is suggested, it is shown in blue text.

TASK 1: Making Sense of a Scenario

Before working with a specific task, it is useful to know what the student *spontaneously* describes and what the student may not do spontaneously but can do when asked. This very open-ended task asks students simply to describe what they observe. For students, it is an opportunity to describe by classifying and counting at varying levels of specificity and precision. For the teacher, it is an opportunity to see both what the students do spontaneously and what they may not do spontaneously but can do when asked.

TASK STEPS

1. Show fruit picture and ask student to describe what he or she sees.
2. Accept any descriptions and ask, "What else can you say?"
3. Probe: If student does describe categories (e.g., apple/strawberry or red/green) but does not give any quantitative information, name one pair of categories that the student identified and ask, "Are there more <category1> or <category2>?"

COMMENTS ON TASK OR STUDENT RESPONSES

This general task assesses the baseline: What does the student observe? Can the student count? Does the student spontaneously classify (red, green; large, small; apple, strawberry; lots of leaves, one leaf, two leaves, no leaves; fruit)? Does the student spontaneously comment on quantities (more apples, three strawberries, four green apples, that one doesn't have leaves, that's a lot of fruit)?

- The design of the art is intentional: two sizes of apple, two colors of fruit, variations in the fruit (no two fruits alike), more red fruits than green fruits, more green apples than red apples, green apples have different numbers of leaves. These categories create the possibility for a variety of numerical combinations: 4 + 6 (green + red or small + large); 3 + 7 (strawberries + apples); 8 + 2 (leaves + no leaves); 3 + 4 + 3 (red apples + green apples + strawberries). Other possible include partial comparisons 6 + 1 (apples by size).
- In step 3 ("Are there more ___ or ___?"), does student count to find out? Does student report the numbers or just the conclusion (e.g., "There are more red ones.")?

At this point in the task, if students attach calculations to their descriptions — for example, saying, "I see six big apples and one little apple, so that's seven apples" — accept it but don't push for it. The goal in this portion of the task is descriptions of the picture; other sections will address students' ability to attach and perform calculations.

OBSERVATIONS OF STUDENTS

A. Student does not try.

B. Student gives a single qualitative description, like "fruit" or "apples," with no further detail (number, color, size, kind of fruit or comparisons).

C. Student categorizes by only one attribute (color, kind of fruit or size), does not see or attempt a second categorization, and does not include *number* as part of the description. For example, student says, "Strawberries and apples" or "Green fruits and red fruits."

D. Student includes a single quantitative description, for example, counting all objects together or counting only one subset (by color, kind of fruit or size) but does not count more than one subset. For example, student says, "I see three strawberries," but does not mention or count the apples.

E. Student is able to categorize in several different ways (kind of fruit, color, number of leaves, size, etc.) and names the quantities of at least some of these sets.

F. Student correctly answers the question — "Are there more ___ or ___?" — by counting the objects in each category.

G. Student correctly answers the prompt without counting out loud.

TASK 2: Problem-Posing Scenario

Students are given a standard and simple word-problem scenario — Eva has six strawberries and Jackson has four strawberries — but without a question. Instead, *they* are invited to suggest observations and/or questions.

TASK STEPS

1. If you are working with a group, call up two students and use their own names. If you are working with one student, ask the student to pretend one hand is Eva and the other hand is Jackson (or whatever names appeal to you and the student). Using *no objects of any kind,* pretend to put six strawberries in one hand as you say, "Eva has six strawberries." Nothing is there, of course, but ask the student to "check" to make sure that Eva got just the right amount. If the student doesn't seem to realize that the whole game is pretend, make that clear. Then pretend to put four strawberries in the other hand as you say, "Jackson has four strawberries."

COMMENTS ON TASK OR STUDENT RESPONSES

Why invisible strawberries? Why not use counters or something else real to make it more concrete? Mathematics depends on many foundations. One of them is good working memory. We help students expand their capacity by providing opportunities to mentally visualize quantities and to "hold" multiple pieces of information in their heads. In not providing counters or a picture, we also move the student more toward mental computation instead of counting to come up with the response. Understanding that this is a formative assessment task, we gain insight into the student's ability in this area.

Why go through the extra step of having the student "check" things that don't exist? Children generally find this step quite funny and a nice invitation to dive into the problem with all their ability to pretend. But there's also a serious mathematical side. Asking the student to check focuses attention on the number because the student has to pretend-count, and it also helps the student create a mental image of the objects in each hand.

OBSERVATIONS OF STUDENTS

H. Student does not try to engage in the pretend scenario. If this happens, name your own hands and "put" the pretend strawberries in them. Then proceed to the next step.

I. Student indicates that he or she understands the play and gives an indication that he or she recognizes that one of the quantities is greater than the other.

2. Ask, "What good questions can you make up about this situation?" Depending on the prior experiences of students in your class, you might word this differently — perhaps "If you were going to make up a story problem (or word problem), what questions might you include in your problem?" You may need to clarify: "So far, the story problem says 'Eva has six strawberries. Jackson has four strawberries.' What question can you ask to make this into a word problem?"

3. Accept every question you get, whether it is mathematical or not, and don't ask the student (or class) to restrict his or her answers. If you get only one, ask, "Can you (anyone) think of any more?"

   The first few times you do this, you want to hear everything so that you get to know your students' thinking — you are assessing as well as teaching — and so that they get to hear a wide variety of responses and don't self-censor. If you are working with the class, you might write each question on a chart, using two columns: one for mathematical questions and one for nonmathematical ones. At the end, comment that some are mathematical and others are social but don't say one kind is better than another. After all, "Why does Jackson have fewer?" and "Will Eva share?" might, in some circumstances, really be the most important and relevant questions!

4. "Any more?" At this age, and especially the first time, students may well run out of questions (or repeat earlier ones just to join in) after only two or three. Count in your head to 20 to leave time for thinking, but if nothing comes, say, "OK, well maybe there *aren't* any more good ones!" and be done.

   If you don't get at least one question about combining (e.g., "How many … altogether?") or comparing (e.g., "How many more … ?"), make the missing ones up and add them to the list. You will need them for the next task.

COMMENTS ON TASK OR STUDENT RESPONSES

Many questions are possible. Some of the following are quite common. Some are rare. Notice that some are not mathematical and that one of the mathematical ones makes no real sense in this context.

- Who has more strawberries?
- Why does Jackson have less?

- How many more strawberries does Eva have?
- Jackson wants to have as many as Eva. How many more does he need?
- How many do the two of them have together?
- If they give them all to me, how many will I get?
- Will Eva share?
- Can they share equally without cutting any strawberries?
- I brought strawberries for lunch today!
- They each ate half of their strawberries. Now how many do they have?
- If Jackson takes one of Eva's strawberries, how many do they have now?
- How much is six take away four?

Students at this age don't always reliably distinguish questions and observations that are mathematical (more, less, total, **can** they share?) from ones that are social or personal (**Why** does Jackson have less? **Will** Eva share? I brought strawberries.). Also, the mathematical questions that they ask may be restricted to types that have become familiar in class, which may limit the variety you hear. A common default of adults, but less so with children, is, "How many do they have altogether?"

And students may ask questions that use information from the problem but not in a way that shows clearly that they are intending to be relevant to the situation. For example, "How much is six take away four?" uses the numbers, and even describes a calculation that could be relevant (e.g., for seeing how many more Eva has), but as stated, it doesn't say what the computation 6 – 4 would tell us about the situation.

One goal of teaching is to help students, over time, learn to distinguish mathematical questions from nonmathematical ones and to increase the variety of mathematical ways of looking at the situation and the variety of questions they ask.

If you do this kind of activity with the entire class regularly (e.g., for just a few minutes at "morning time" two or three times a week, taking any suitable word problem from whatever curriculum you are using and removing the associated question) and you occasionally introduce 1st grade appropriate question(s) of your own, students do develop a greater repertoire over the course of the year.

OBSERVATIONS OF STUDENTS

J. Student does not respond with a question or observation about the *story* situation. Child may say nothing or describe only the *reality* ("I don't see anything in my hands") or simply restate the story scenario ("Eva has six strawberries").

K. Student asks one relevant question but only about the stated facts of the situation ("How many strawberries does Eva have?"), not about unstated information that can be derived from those facts (like who has more).

L. Student asks a nonmathematical question.

M. Student asks a genuinely mathematical question, easy or hard, that could imaginably be used in a word problem but, even with prompting, finds only one such question to ask.

N. With prompting, student provides more than one question, showing mathematical flexibility within this scenario.

O. Student spontaneously offers more than one relevant mathematical question.

TASK 3: Compare or Combine Scenario

Student(s) will answer a question created in the previous task.

TASK STEPS

1. Choose a problem that involves combining the two collections of strawberries or counting them all.
   - How many … altogether?
   - If they both gave me all their strawberries, how many would I have?

   Have the student(s) do the necessary calculation to answer the question.

   #### COMMENTS ON TASK OR STUDENT RESPONSES

   Depending on prior experience, students might be able to add the two numbers or recognize them as a 10-pair (two numbers whose sum is 10). Otherwise, they might just count the nonexistent objects mentally. Recognizing that this task is intended to assess the student(s)' ability to perform this calculation without physical objects, this is not the time to provide these counters or pictures. Make note of this need and provide those aids for the students who need them during a future lesson. Whether the child answers correctly or not, you might ask, "How did you come up with that answer?" to determine more information about whether the student counted all the objects, counted on from one of the addends or recognized the 10-pair.

   #### OBSERVATIONS OF STUDENTS

   P. Student is not able to calculate the correct sum to answer the question.

   Q. Student is able to provide the correct answer.

   R. In both cases, the teacher should make note of the method the student described for the calculation.

2. Choose a problem that involves comparing the two collections of strawberries.
   - How many more does Eva have than Jackson?
   - How many more does Jackson need to have the same as Eva?
   - How many does Eva need to eat so that she and Jackson have the same number?

Have the student(s) do the necessary calculation to answer the question.

COMMENTS ON TASK OR STUDENT RESPONSES

Problems of this type can be calculated several ways. One goal is to determine whether or not the student can answer the question correctly. Another is to ascertain how the student calculates the answer. These problems can be viewed as a difference problem (6 – 4 = ?) or an unknown addend problem (4 + ? = 6). (See Common Core State Standards for Mathematics Glossary, page 88, for more details.) It does not matter which of these methods is the student's preference, but knowing which the student chooses helps you understand how the student approaches the calculation. Again, whether the student answers correctly or not, ask, "How did you come up with that answer?" and make note of the response.

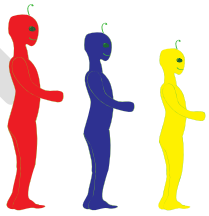
OBSERVATIONS OF STUDENTS

S. Student is not able to calculate the correct sum to answer the question.

T. Student is able to provide the correct answer.

U. In both cases, the teacher should make note of the method described.

TASK 4: Partitioning Scenario



The student tries to find as many ways as possible to partition 10 pennies, giving some to each of the three space people, with the most going to Red, fewer to Blue and the fewest to Yellow. Use counters (preferably real pennies) and pictures of the three creatures (provided) or three cups in three different colors if you prefer.

TASK STEPS

1. Show students the picture of the three people and give the student 10 pennies (or other counters) to experiment with. Tell the student, "Three very small and very colorful space people just came to visit you. You have 10 pennies, and you decide to give them all to your visitors as a present. Yellow says, 'That's a *very* nice present. Thank you *very* much. I'm tiny, and pennies are quite big. Please, can I have the fewest?' And Blue says, 'That's a *very*, ***very*** nice present. Thank you *very*, ***very*** much. But I'm small, too, and pennies are big. I can carry more than Yellow, but not as much as Red. Can I have a middle-size amount?' And then Red says, 'That's a *very*, ***very***, ***very*** nice present. Thank you *very*, ***very***, ***very*** much. They're right. Pennies are big. But I'm the biggest, and I don't want them to have to carry too much! I'm willing to take the most.' You giggle and then give all of your pennies to them, making sure Red gets the most and Yellow gets the least. Show one way that you can do that!"

COMMENTS ON TASK OR STUDENT RESPONSES

Any question you give students should be as clear and unambiguous as possible so that the effort they expend is on the mathematics and not on figuring out what you meant. But, especially in formative assessment, it is often useful to start with the least scaffolded question and provide additional support if necessary for clarification. This gives you the most information about what the student is able to do on his or her own. You will also want to respond with questions or information rather than evaluation, positive or negative, and keep the interaction

playful. Whether their arrangement is correct or not, you can say, "OK, let's check to see if you've done what they asked for! I'll read the story again, and you check to make sure they all got what they wanted." That suggests a way for students to evaluate the correctness of their solution on their own, rather than "Great job!" or "Almost; try again," which make you the evaluator of correctness.

Whether the student's answer happened to be correct or not, if a student cannot seem to judge the correctness, keep a record of that, and see if asking leading questions helps. You're handling understanding the story much the way you might do it in an English language arts class. "Do you remember who wanted the least? Why did that one want the least? And who should get the most? Why? Now let's check. Did Yellow get the least? Did Red get the most? Did Blue get a middle-size amount?"

OBSERVATIONS OF STUDENTS

V. Student does not attempt the task or seems uncertain what to do. If this happens, offer to read the story again.

W. Student still does not attempt the task. So you start by giving 4 to Red, 3 to Blue and 3 to Yellow and say, "OK, let's check to see if you've done what they asked for! I'll read the story again, and you check to make sure they all got what they wanted." At each critical point in the story, ask the student to check to make sure things are right and, if not, "fix" them.

X. Student gives pennies to the space people but not in a way that meets the rule. "OK, let's check to see if you've done what they asked for! I'll read the story again, and you check to make sure they all got what they wanted." At each critical point in the story, ask the student to check to make sure things are right and, if not, "fix" them. Then check again by rereading the story.

Y. Student gives pennies to the space people in a way that meets the rule. "OK, let's check to see if you've done what they asked for! I'll read the story again, and you check to make sure they all got what they wanted." At each critical point in the story, ask the student to check to make sure things are right. If student cannot *judge* the correctness, ask questions to elicit what the student understands from the story. "Do you remember who wanted the least? Why did that one want the least? And who should get the most? Why? Now let's check. Did Yellow get the least? Did Red get the most? Did Blue get a middle-size amount?"

Z. Student gives pennies correctly and can check correctly.

2. Once the student has provided a correct scenario, ask if there is any other way to give Yellow the least and Red the most. Continue this until student declares that there are no other ways.

COMMENTS ON TASK OR STUDENT RESPONSES

Enumerating combinations per se is not in the 1st grade standards. But asking students to find as many ways as possible to meet a set of criteria has two purposes. It builds perseverance, and it begins the process of a student trying to think of a way to determine whether he or she has found all of the possibilities. Because this is a formative assessment, this portion of the task is included to help you ascertain where the student falls on these two spectra. One way to do this

problem is to start with an amount that you can give to Red and then give Yellow and Blue the remaining coins. Solutions include (R-Y-B): 7-2-1, 6-3-1, 5-4-1 and 5-3-2.

OBSERVATIONS OF STUDENTS

AA. Student stops after finding one solution.

BB. Student finds a few solutions but not all of them.

CC. Student is able to systematically determine that he or she has found all of the solutions to this problem.