

THEME: Place Value Situations & Comparisons of Data**OPERATIONS AND ALGEBRAIC (OA)****Represent and solve problems involving addition and subtraction**

1.OA.2 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.

Understand and apply properties of operations and the relationship between addition and subtraction.

1.OA.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 $2 + 6 + 4 = 2 + 10 = 12$. (Associative property of addition.)

Add and subtract within 20.

1.OA.5 Relate counting to addition and subtraction, e.g., by counting on 2 to add 2.

1.OA.6 Add and subtract within 20, demonstrating fluency with various strategies for addition and subtraction within 10. Strategies may include counting on; making ten, (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$) decomposing a number leading to a ten, (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$) using the relationship between addition and subtraction, (e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$) and creating equivalent but easier or known sums, (e.g. adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).

Work with addition and subtraction

1.OA.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: $8 + \underline{\quad} = 11$; $5 = \underline{\quad} - 3$; $6 + 6 + \underline{\quad}$

NUMBER AND OPERATIONS IN BASE TEN (NBT)**Extend the counting sequence.**

1.NBT.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

Use place value understanding and properties of operations to add and subtract.

1.NBT.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; record the strategy with a written numerical method (drawings and, when appropriate, equations) and explain the reasoning used. Understand that when adding two-digit numbers, tens are added to tens; ones are added to ones; and sometimes it is necessary to compose a ten.

1.NBT.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.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.

MEASUREMENT AND DATA (MD)**Represent and interpret data.**

1.MD.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Commentary:

Students use models including physical objects, part-part-whole charts, and number lines to develop strategies for adding and subtracting whole numbers, building in their previous work with smaller numbers.

As students solve problems with addition and subtraction, they are connecting the counting they did in kindergarten to adding and subtracting numbers. Work with models such as ten frames and linking cubes support the strategy of using ten as a benchmark to solve addition and subtraction problems within 20 by decomposing and composing addends. Experiences in the order of addends is reversed establishes a fundamental property (commutative) of addition and later multiplication. The order of the addends does not change the total (sum). Students explore and use patterns they see to begin to develop an understanding of important properties of addition and subtraction.

First grade students continue to explore and make sense out of number combinations to 20, beginning with extending counting strategies to a larger range of numbers. Through carefully planned experiences, more sophisticated strategies become apparent. For example, once students know doubles in addition, they can begin to work with examples that can be modeled using doubles plus 1 or 2 more ($3 + 4$ can be thought of as $3 + 3 + 1$). Students should have many opportunities to model, draw conclusions, and share their thinking in order to deeply understand and make use of these strategies. Questions posed by the teacher can help students to move from concrete models and pictures to equations and using strategies to practice basic facts.

Students should make the explicit transition to experiences with symbolic representation for addition and subtraction. Students begin to write equations with unknowns as they solve problems.

Students can count on from any number less than 120. They read, write, and represent any number to 120. This is the foundation for thinking about place value and the meaning of the digits in a numeral.

Commentary:

Once a deep understanding of place value concepts has been established, students use concrete materials to develop and understand the process for adding and subtracting up to 100. Students also develop mental strategies for finding 10 more or 10 less than a number up to 100. Subtraction with two 2-digit numbers is limited to subtracting multiples of 10.

Students begin to develop understanding and skill with adding beyond the basic facts through the use of concrete representations. Students progress to making generalizations and developing their own strategies for adding one- and two-digit numbers. Include problems that provide a context for addition as often as possible. Equations should be written both horizontally and vertically. Encourage students to make estimates before adding to determine if their answers are reasonable.

It is not expected that students master the standard algorithm for addition at this time.

Student's work with place value requires them to understand and apply the concept of ten by mentally finding 10 more or 10 less.

Students are expected to subtract multiples of 10 from greater multiples of 10, using understanding of subtraction and a variety of strategies. Connections among concrete, pictorial, and eventually written equations should be explicit.

Students are engaged in collecting and using data to answer questions relevant to their lives.

Students will form a question, collect data in a chart or table form, organize the data, and interpret the results to answer a question.

Using three categories, first graders will summarize data by describing the categories with the most or least responses along with difference.

Instructional Resources

Math Expressions: Unit 5 (Sections: 5.1 – 5.12); Unit 6 (Sections 6.1 – 6.9)

Manipulatives: Student Math White Boards, Objects for counting, such as beans, Linking cubes, Two-Color counters, Hundreds chart, Ten Frames, Double ten frames, Dot Cards, Numeral cards, Open number line, Part-Part-Whole chart, Dice (1-6, 1-10), Spinners (1-4, 1-5, 1-6, 1-10) Number line to 20, Open number line, Linking cubes for place value, Straws or other objects for place value, Place value chart to tens, and Greater than, Less than = cards, a variety of objects to measure found in the classroom such as books, desks, and book shelves, Individual student whiteboard/ markers and/or paper/pencil to collect data

Achieve The Core Fluency Resource

Digital: Think Central – Soar to Success for Below Level and Mega Math for On Level

Differentiated Instructional Activities: Pages: 403, 411, 419, 427, 435, 443, 449, 457, 465, 475, 481, 493, 501, 507, 513, 519, 527, 535, 541, 547

Assessment Resources

Unit 5: Quick Quiz 1 and 2

Unit 5: Assessment Form A and Form B

Unit 6: Quick Quiz 1 and 2

Unit 6 Assessment Form A and Form B

Formative: “Check for Understanding embedded in each lesson.

Addressing Student Misconceptions and Common Errors**1.OA.2**

Some students think it is not possible to add more than two numbers. Although they may be familiar with seeing addition equations with three or more addends, they do not write equations with three or more addends.

Addressing Student Misconceptions and Common Errors Cont.**1.OA.2 cont.**

Students consider composing and decomposing numbers to learn facts, develop computation strategies, and do mental mathematics. The understanding that addition equations can contain more than two addends is important. Once students have had experience working with three addends, using concrete materials and drawings, they should have opportunities to write and solve addition equations with three or more addends.

1.OA.3

Although subtraction is not commutative, it is important not to contribute to a potential student misconception by saying that you cannot take a larger number from a smaller number. It is appropriate to say that $8 - 5 \neq 5 - 8$.

It is possible to take a larger number from a smaller number. The result will be a negative number. Integers are not introduced until middle school.

1.OA.5

Watch for students who may double count a number when adding or subtracting. This may occur with physical objects, pictures or using a hundreds chart. For example, if a student is adding $6 + 4$, she may begin with the 6 (6, 7, 8, 9) with a result of 9 rather than counting on to the 6 (7, 8, 9, 10). The same may happen in subtraction. If a student is counting to subtract $8 - 5$, he may count the 8 as part of the count (8, 7, 6, 5, 4) with a result of 4 rather than subtracting from the 8 (7, 6, 5, 4, 3) to get the accurate amount. Not only should this be pointed out to students, but it is essential also to provide more explicit experiences with concrete materials in which students are adding on the given addend or subtracting from the total.

1.OA.6

Continue to watch for students who are double counting a number when adding or subtracting.

Addressing Student Misconceptions and Common Errors Cont.**1.OA.8**

Although students may be able to model problem situations with materials and pictures, the transition to writing equations using symbols may be more difficult for them, particularly when their reasoning requires finding a missing addend. Asking students to explain their reasoning as they solve the problem with materials will help them to connect what they have done with the materials to the symbolic equation. Be sure that students have multiple experiences solving equations in which the unknown is in different positions.

$$3 + 8 = \underline{\quad} \quad 3 + \underline{\quad} = 11 \quad \underline{\quad} + 3 = 11 \quad 11 - 3 = \underline{\quad} \quad 11 - \underline{\quad} = 8 \quad \underline{\quad} - 3 = 8$$

1.NBT.1

It is not expected that students develop an understanding of place value with this standard. However, watch for students who reverse digits in writing the numeral or do not demonstrate an understanding that 21 does not have the same value as 12. When reversals occur, have students model each number, using straws or linking cubes to reinforce the place value of digits and to help differentiate between the numbers.

1.NBT.4

Students who do not know basic facts may be inaccurate computing with two-digit numbers. As those students continue to work on facts, physical models will help in adding accurately. Be sure that all students have ample experience with adding physical models on place value charts, counting on by benchmark numbers (tens and ones), using a hundreds chart, and using ten frames as appropriate. Make explicit connections among written physical models, strategies, and written formats.

Regrouping (composing tens from ones) when adding two-digit numbers is included in this standard. It is appropriate for students to use physical models for these examples and explain their reasoning, explicitly connecting physical models with symbolic notation (written equations).

Addressing Student Misconceptions and Common Errors Cont.**1.NBT.5**

Since understanding the concept of 10 more or 10 less leads to understanding additional place value concepts, students who depend on counting or using their fingers have not met this standard. Students who cannot determine 10 more or 10 less than a number from 1 to 100 need more experience with concrete materials, such as linking cubes or bundles of straws. Finding patterns on the hundreds chart is also helpful, but the language can be confusing for some students (i.e., I go up a row to find 10 less and down a row to find 10 more).

1.NBT.6

Some students may subtract the digits in the tens place but ignore the digits in the ones place. Ask them to describe what they are subtracting in terms of place value. For example, in subtracting $70 - 40$, students should say they are taking 4 tens from 7 tens (or 7 tens minus 4 tens). Have them put concrete models on the place value chart and then subtract or physically remove the 4 tens from the 7 tens. They describe the difference as 3 tens. Ask them how to write 3 tens (30) and how many ones are in that number. They should explain why there are 0 ones and why it is necessary to put the digit 0 in the ones place.

1.MD.4

Some students may pose a question that has too many choices such as “What is your favorite color?” To help with this error, ensure students limit the categories to only three choices. Some children may not realize they have not collected data from every student in the class. To help with this error, make sure students know the total number of classmates who will be answering the question. Some students may not be able to summarize with statements like, “The majority of the students like or have -,” or similar statements. To help with this, review and discuss summary statements.

Source: The Common Core Mathematics Companion: The Standards Decoded (What They Say, What They Mean, How to Teach Them)

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