Vertical Progression:

TS Gold	**20. Uses number concepts and operations** **20.b. Quantifies** **6.** Makes sets of 6-10 objects and then describes the parts; identifies which part has more, less, or the same (equal); counts all or counts on to find out how many. **8.** Uses a variety of strategies (counting objects or fingers, counting on, or counting back) to solve problems with more than 10 objects. **20.c** Connects numerals to 20 by name and connects each to counted objects.
Kindergarten	**K.OA.A Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.** o **K.OA.A.1** Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), and acting out situations, verbal explanations, expressions, or equations. o **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 (e.g., $5 = 2 + 3$ and $5 = 4 + 1$). o **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. o **K.OA.A.5** Fluently add and subtract within 5.
1st Grade	**1.OA.D Work with addition and subtraction equations.** o **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? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$.* o **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 $8 + ? = 11$, $5 = ? - 3$, $6 + 6 = ?$*
2nd Grade	**2.OA.A Represent and solve problems involving addition and subtraction.** o **2.OA.A.1** Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. o **2.OA.B Add and subtract within 20.** o **2.OA.B.2** Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

Students will demonstrate command of the ELG by:

- Explaining the meaning of the equal sign.
- Determining whether an addition or subtraction equation is true or false.
- Using manipulatives to show how the two sides of an equation are equal.
- Explaining and demonstrating how the unknown number in an equation is found.
- Solving an equation to find the unknown number in an addition or subtraction sentence.
- Utilizing a variety of strategies to find an unknown number.

Vocabulary:

- addition
- difference
- equal
- equal sign
- equation
- false equation
- subtraction
- sum
- true equation
- unknown
- whole number

Sample Instructional/Assessment Tasks:

1) **Standard(s):** 1.OA.D.7

Source: Illustrative Mathematics
https://www.illustrativemathematics.org/content-standards/1/OA/D/7/tasks/466

Task: Valid Equalities?

Decide if the equations are true or false. Explain your answer.

a. **2 + 5 = 6**
b. **3 + 4 = 2 + 5**
c. **8 = 4 + 4**
d. **3 + 4 + 2 = 4 + 5**
e. **5 + 3 = 8 + 1**
f. **1 + 2 = 12**
g. **12 = 10 + 2**
h. **3 + 2 = 2 + 3**
i. **32 = 32**

Correct Answer:

While the question asks for simple "true" or "false" answers, complete solutions include some valid explanation. There are many possible explanations, so we give a variety of kinds of explanations in these solutions.

a. False. 2 + 5 equals 7 and not 6.
b. True. Both sides equal 7.
c. True. Since 4 + 4 = 8, 8 = 4 + 4.
d. True. We can combine the three and the two on the left to get 5, and then after reordering both sides are 4 + 5.
e. False. 3 + 5 is 8 but 8 + 1 is 9.
f. False. 1 + 2 = 3, which is less than 12.
g. True. If you count up two from 10 you get 12 (Alternately, 12 means one ten and two ones.)
h. True. You can always change the order of numbers being added.
i. False. 32 is 3 tens and 2 ones. 23 is 2 tens and 3 ones.

2) Standard(s): 1.OA.D.7

Source: Illustrative Mathematics
https://www.illustrativemathematics.org/content-standards/1/OA/D/7/tasks/1152

Materials: 20 counters or linking cubes per pair of students, pencil, copy of the problem

Actions:

The teacher poses the problem: Bo bought 20 tickets to play games at Family Fun Night at his school. He wants to play each game at least once. He needs to use all of his tickets. How many times might he play each game? Find at least two ways he can do it.

Game	Number of Tickets Needed
Ring Toss	1
Putt-Putt Golf	2
Soccer Kick	3
Moonwalk	5

When all pairs of students have had a chance to find at least one solution, the teacher can lead a whole group discussion and record each solution as an equation on chart paper or the chalkboard/whiteboard/SmartBoard.

Solution: There are many different solutions students create. Please see samples from Illustrative Mathematics.

3) Standard: 1.OA.D.8

Source: Illustrative Mathematics
https://www.illustrativemathematics.org/content-standards/1/OA/D/8/tasks/4

Task:

Find the missing number in each of the following equations:

$$9 - 3 = \square \qquad 8 + \square = 15 \qquad 16 - \square = 5$$

$$\square = 7 - 2 \qquad 13 = \square + 7 \qquad 6 = 14 - \square$$

Solution:

- We know that if we subtract 3 from nine, the result is 6 so the missing number in the first equation is 6.
- We either count up from 8 to 15 or subtract 8 from 15. In either case, the result is 7.
- We can ask, "What number do we need to subtract from 16 to get 5?" or "5 plus what number is 16?" In either case, the answer is 11.
- We know that if we subtract 2 from seven, the result is 5 so the missing number in the first equation is 5.
- We can either count up from 7 to 13 or subtract 7 from 13. In either case, the result is 6.
- We can ask, "What number do we need to subtract from 14 to get 6?" or "6 plus what number is 14?" In either case, the answer is 8.