

Represent and solve problems involving addition and subtraction within 20

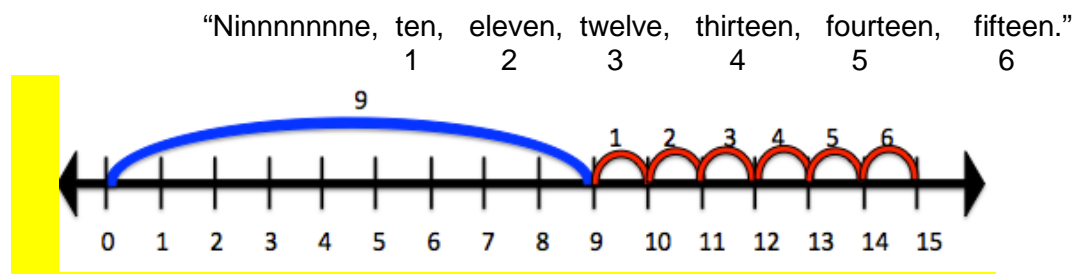
Standard 1.OA.6 Add and subtract within 20.

- A. Use strategies such as counting on; making ten (for example, $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (for example, $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (for example, knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$); and creating equivalent but easier or known sums (for example, adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).
- B. By the end of Grade 1, demonstrate fluency for addition and subtraction within 10.

Key Elements: Students will effectively use strategies to add and subtract within 20. They will build fluency adding and subtracting within 10.

Strategies to add and Subtract within 20

Counting On: In the equation $9 + \underline{\quad} = 15$, students see that 9 is part of 15 and that when counting they take the 9 as “done” and continue counting until they reach 15. For example;



Students may keep track of their counting by using fingers or head bobs, knowing that the last number said is the answer.

Making a ten: Students may solve the equation $9 + 6 = \underline{\quad}$ by decomposing the 6 into partners $1 + 5$, taking the 1 adding $9 + 1$ to get 10, then adding $10 + 5$ to get 15. (See picture below for make a ten model).



Decomposing numbers leading to a ten: Students may extend the strategy of making a ten to decomposing numbers into a ten. For example,

To solve $15 - 6 = \underline{\quad}$, student may decompose 6 by subtracting 5 to get 10, then subtracting 1 more to get to 9.

$$\begin{array}{r} 15 - 6 = \square \\ \quad \swarrow \searrow \\ \quad 5 \quad 1 \\ 15 - 5 = 10 \\ 10 - 1 = \square \\ \text{So } 15 - 6 = \square \end{array}$$

Relationship between addition and subtraction: For some equations, students find it is easier to use the inverse operation to solve the equation. For example: $\underline{\quad} + 6 = 15$. Student can turn this equation into its related fact $15 - 6 = \underline{\quad}$ and solve the related to find the missing addend.

Creating equivalent but easier or known sums

When solving the problem $5 + 7$, students can re-write the equation to an equivalent sum: $5 + 5 + 2$. This is easier because students can recognize the ten partner $5 + 5$ to make a ten, and then they just add two more. This same principle can be done with doubles plus one, doubles minus one, doubles plus two and doubles minus two, make a ten facts, and with any other equation that is “friendly” or easy to them.

Fluency for Addition and Subtraction Within 10

***In kindergarten, students are only required to add and subtract fluently within five (K.OA.5). ***

Please note: “Procedural fluency is more than memorizing facts or procedures, and it is more than understanding and being able to use one procedure for a given situation. Procedural fluency builds on a foundation of conceptual understanding, strategic reasoning, and problem solving.” (Procedural Fluency in Mathematics, NTCM).

“Practice should be brief, engaging, purposeful and distributed (Rohrer, 2009), (Procedural Fluency in Mathematics, NTCM).

Students can build fluency of basic facts through meaningful addition/subtraction facts games, using manipulatives to model and solve problems within ten, through exposure in word problems, and practice in every-day calculations using student-selected strategies.