

Kindergarten Standards

Count to tell the number of objects.

4. Understand the relationship between numbers and quantities; connect counting to cardinality.
[K-CC4]
 - a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. [K-CC4a]
 - b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
[K-CC4b]
 - c. Understand that each successive number name refers to a quantity that is one larger.
[K-CC4c]

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. [K-CC5]

Essential Understandings (Mathematical Goals)

- Counting includes one-to-one correspondence, regardless of the kind of objects in the set and the order in which they are counted.
- When counting objects in a group/set, the last number stated names the total number of objects in that group/set

Grade 1 Standards

Represent and solve problems involving addition and subtraction.

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. [1-OA2]

Understand place value.

11. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$. [1-NBT3]

Essential Understandings (Mathematical Goals)

- The addition of whole numbers is based on sequential counting.
- Addition equations can be used to describe situations that involve combining quantities.

Grade 2 Standards

Represent and solve problems involving addition and subtraction.

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. (See Appendix A, Table 1.) [2-OA1]

Relate addition and subtraction to length.

18. 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. [2-MD5]

Essential Understandings (Mathematical Goals)

- Missing numbers in a math sentence/equation or word problem can be found using addition and subtraction.
- Understand how addition and subtraction relate to one another.
- Subtraction is the inverse operation of addition and is used for different reasons:
 - to remove one amount from another;
 - to compare one amount to another; and
 - to find the missing quantity when the whole quantity and part of the quantity are known.

Grade 3 Standards

Represent and solve problems involving multiplication and division.

1. Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. [3-OA1] Example: Describe a context in which a total number of objects can be expressed as 5×7 .

2. Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. [3-OA2]

Example: Describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.

3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (See Appendix A, Table 2.) [3-OA3]

Understand properties of multiplication and the relationship between multiplication and division.

5. Apply properties of operations as strategies to multiply and divide. (Students need not use formal terms for these properties.) [3-OA5]

Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication)

$3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication)

Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property)

Essential Understandings (Mathematical Goals)

- Multiplication can be used to find the total number of objects when there are a specific number of groups with the same number of objects.
- When multiplying two factors, either factor can be partitioned or both.
Example: $4 \times 16 = 4 \times (10 + 6)$ or $(2 + 2) \times 16$.
- Division can be used to find how many equal groups (measurement – repeated subtraction) or how many are in each group (partitive – sharing).
- Multiplication and division have an inverse relationship and can be used to find division or multiplication facts.

Grade 4 Standards

Extend understanding of fraction equivalence and ordering.

13. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model. [4-NF2]

Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

14.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. [4-NF3d]

Essential Understandings (Mathematical Goals)

- Comparison to known benchmark quantities can help determine the relative size of a fractional piece because the benchmark quantity can be seen as greater than, less than, or the same as the piece.
- A rational number is an operator when it changes or transforms another number or quantity to magnify or shrink it.
- The interpretations of the operations on rational numbers are essentially the same as those on whole numbers, but some interpretations require adaptation, and the algorithms are different.
- A scalar definition of multiplication is useful in representing and solving problems beyond whole number multiplication and division.

Grade 5 Standards

Use equivalent fractions as a strategy to add and subtract fractions.

11. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. [5-NF1]

Example: $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{(ad+bc)}{bd}$.)

12. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally, and assess the reasonableness of answers. [5-NF2]

Example: Recognize an incorrect result $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$ by observing that $\frac{3}{7} < \frac{1}{2}$.

Essential Understandings (Mathematical Goals)

- The interpretations of the operations on rational numbers are essentially the same as those on whole numbers, but some interpretations require adaptations and the algorithms are different.
- Estimation and mental math are more complex with rational numbers than with whole numbers.