

NF Number and Operations—Fractions

- **4.NF.A Extend understanding of fraction equivalence and ordering for fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.**
 - **4.NF.A.1 Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the numbers and sizes of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions, including fractions greater than 1.**
 - [Find equivalent fractions using area models \(4-O.5\)](#)
 - [Graph equivalent fractions on number lines \(4-O.6\)](#)
 - [Equivalent fractions: find the missing numerator or denominator \(4-O.8\)](#)
 - [Fractions with denominators of 10 and 100 \(4-O.9\)](#)
 - **4.NF.A.2 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 $1/2$. 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.**
 - [Compare fractions using models \(4-O.15\)](#)
 - [Benchmark fractions \(4-O.16\)](#)
 - [Compare fractions using benchmarks \(4-O.17\)](#)
 - [Compare fractions using benchmarks: find the missing numerator \(4-O.18\)](#)
 - [Compare fractions \(4-O.19\)](#)
 - [Compare fractions: find the missing numerator or denominator \(4-O.20\)](#)
 - [Compare fractions in recipes \(4-O.21\)](#)
- **4.NF.B Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers for fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.**
 - **4.NF.B.3 Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.**
 - **4.NF.B.3.a Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. (The whole can be a set of objects.)**
 - [Add fractions with like denominators using area models \(4-P.5\)](#)
 - [Add fractions with like denominators using strip models \(4-P.6\)](#)
 - [Add fractions with like denominators \(4-P.8\)](#)
 - [Subtract fractions with like denominators using area models \(4-P.9\)](#)
 - [Subtract fractions with like denominators using strip models \(4-P.10\)](#)
 - [Subtract fractions with like denominators \(4-P.12\)](#)
 - **4.NF.B.3.b Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using drawings or visual fraction models.**
 - [Decompose fractions into unit fractions using models \(4-P.1\)](#)

- [Decompose fractions into unit fractions \(4-P.2\)](#)
 - [Decompose fractions \(4-P.3\)](#)
 - [Decompose fractions multiple ways \(4-P.4\)](#)
 - **4.NF.B.3.c Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.**
 - [Add fractions with like denominators using number lines \(4-P.7\)](#)
 - [Subtract fractions with like denominators using number lines \(4-P.11\)](#)
 - [Add and subtract fractions with like denominators using number lines \(4-P.13\)](#)
 - [Add and subtract mixed numbers with like denominators \(4-P.19\)](#)
 - **4.NF.B.3.d Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using drawings or visual fraction models and equations to represent the problem.**
 - [Add and subtract fractions with like denominators: word problems \(4-P.16\)](#)
 - [Add and subtract fractions with like denominators in recipes \(4-P.17\)](#)
 - [Add and subtract mixed numbers with like denominators: word problems \(4-P.20\)](#)
- **4.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.**
 - **4.NF.B.4.a Understand a fraction a/b as a multiple of $1/b$.**
 - [Multiply unit fractions by whole numbers using number lines \(4-R.1\)](#)
 - [Multiply unit fractions by whole numbers using models \(4-R.2\)](#)
 - [Multiples of unit fractions: find the missing numbers \(4-R.3\)](#)
 - [Multiply unit fractions by whole numbers: sorting \(4-R.4\)](#)
 - **4.NF.B.4.b Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number.**
 - [Multiply unit fractions by whole numbers \(4-R.5\)](#)
 - [Multiply fractions by whole numbers using number lines \(4-R.7\)](#)
 - [Multiply fractions by whole numbers using models \(4-R.8\)](#)
 - [Multiply fractions by whole numbers using models: complete the equation \(4-R.9\)](#)
 - [Multiples of fractions: find the missing numbers \(4-R.10\)](#)
 - [Multiply fractions by whole numbers: sorting \(4-R.11\)](#)
 - [Multiply fractions by whole numbers \(4-R.12\)](#)
 - **4.NF.B.4.c Solve word problems involving multiplication of a fraction by a whole number, e.g., by**

using visual fraction models and equations to represent the problem.

- [Multiply unit fractions by whole numbers: word problems \(4-R.6\)](#)
 - [Multiply fractions by whole numbers: word problems \(4-R.13\)](#)
 - [Multiply fractions and mixed numbers by whole numbers in recipes \(4-R.14\)](#)
- **4.NF.C Understand decimal notation for fractions, and compare decimal fractions.**
 - **4.NF.C.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.**
 - [Add fractions: denominators 10 and 100 \(4-Q.1\)](#)
 - [Identify fraction expressions with a particular sum: denominators of 10 and 100 \(4-Q.2\)](#)
 - **4.NF.C.6 Use decimal notation to represent fractions with denominators 10 or 100.**
 - [Model decimals and fractions \(4-S.2\)](#)
 - [Graph fractions as decimals on number lines \(4-S.9\)](#)
 - [Convert fractions and mixed numbers to decimals - denominators of 10 and 100 \(4-S.10\)](#)
 - [Convert decimals to fractions and mixed numbers \(4-S.12\)](#)
 - **4.NF.C.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.**
 - [Compare money amounts \(4-L.3\)](#)
 - [Compare decimals using models \(4-S.15\)](#)
 - [Compare decimals on number lines \(4-S.16\)](#)
 - [Compare decimal numbers \(4-S.17\)](#)
 - [Compare decimals and fractions on number lines \(4-S.20\)](#)
 - [Compare decimals and fractions \(4-S.21\)](#)