

Vertical Progression:

<p>2nd Grade</p>	<p>2.G.A Reason with shapes and their attributes.</p> <ul style="list-style-type: none"> ○ 2.G.A.3 Partition circles and rectangles into two, three, or equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.
<p>3rd Grade</p>	<p>3.NF.A Develop understanding of fractions as numbers.</p> <ul style="list-style-type: none"> ○ 3.NF.A.1 Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$. ○ 3.NF.A.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. <ul style="list-style-type: none"> ○ 3.NF.A.3.a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. ○ 3.NF.A.3.b Recognize and generate simple equivalent fractions (e.g., $1/2=2/4$, $4/6=2/3$). Explain why the fractions are equivalent, <ul style="list-style-type: none"> ○ e.g. by using visual fraction models. ○ 3.NF.A.3.c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. ○ 3.NF.A.3.d Compare two fractions with the same numerator or the same denominator by reasoning about their size. 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.
<p>4th Grade</p>	<p>4.NF.B Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.</p> <ul style="list-style-type: none"> ○ 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. ○ 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 a visual fraction model. ○ 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. ○ 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 visual fraction models and equations to represent the problem. ○ 4.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. <ul style="list-style-type: none"> ○ 4.NF.B.4.a Understand a fraction a/b as a multiple of $1/b$. For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$. ○ 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. For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.) ○ 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.

ELG 4.NF.B Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers

5 th Grade	<p>5.NF.A Use equivalent fractions to add and subtract fractions.</p> <ul style="list-style-type: none">○ 5.NF.A.1 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.NF.A.2 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. <p>5.NF.B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.</p> <ul style="list-style-type: none">○ 5.NF.B.4: Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.○ 5.NF.B.4.a Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$.
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Students will demonstrate command of the ELG by:

- Adding and subtracting fractions with like denominators and mixed numbers with like denominators.
- Decomposing fractions into sums of fractions with same denominators in more than one way.
- Recording each decomposition with an equation and justify decompositions.
- Converting an improper fraction to a mixed fraction and a mixed fraction to an improper fraction.
- Using a visual fraction model and equation(s) to represent a problem.
- Multiplying a whole number and a fraction.
- Solving problems involving multiplying fractions by whole numbers.
- Solving word problems involving adding and subtracting fractions referring to the same whole and having like denominators.

Vocabulary:

- decompose
- denominator
- equivalent
- fraction
- mixed number
- multiple
- numerator
- operations
- separating
- subtraction

Sample Instructional/Assessment Tasks:

1) Standards: 4.NF.B.4

Source: Achieve the Core

<http://achievethecore.org/page/1056/fraction-concepts-mini-assessment-detail-pg>

Item Prompt:

1. Nicole gives $\frac{6}{8}$ cup of food to each of her rabbits every day. She has 7 rabbits.
 - a. How many total cups of food does Nicole give to her 7 rabbits every day? _____
 - b. Put a whole number in each blank to make this sentence true:
Nicole will feed the rabbits between _____ and _____ cups of food every day.

Correct Answer:

- a. How many total cups of food does Nicole give to her 7 rabbits every day? $\frac{42}{8}$ or equivalent
- b. Nicole will feed the rabbits between 5 and 6 cups of food total every day.

2) Standards: 4.NF.B.3

Source: Illustrated Mathematics

Item Prompt:

Cynthia is making her famous "Perfect Punch" for a party. After looking through the recipe, Cynthia knows that she needs to mix $4\frac{5}{8}$ gallons of fruit juice concentrate with $3\frac{7}{8}$ gallons of lemon lime soda.

- a. Just as she is about to get started she realizes that she only has one 10-gallon container to use for mixing. Will this container be big enough to hold all the ingredients?
- b. How much punch will this recipe make?

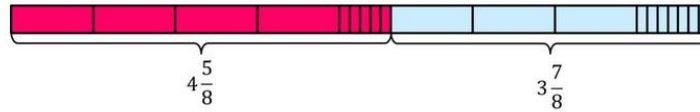
Correct Answer & Analysis:

- a. The container is large enough to hold all of the ingredients. Perhaps the easiest way to see this is by observing that $4\frac{5}{8}$ is less than 5 and $3\frac{7}{8}$ is less than 4, so $4\frac{5}{8} + 3\frac{7}{8}$ is less than 9. Since there are less than 9 gallons of ingredients altogether they will certainly all fit in a 10-gallon container.

4th Grade Math

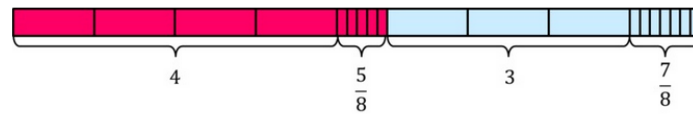
ELG 4.NF.B Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers

b. To see how much total punch is made we need to add the amount of lemon lime soda to the amount of fruit juice. The picture below represents $4\frac{5}{8} + 3\frac{7}{8}$.



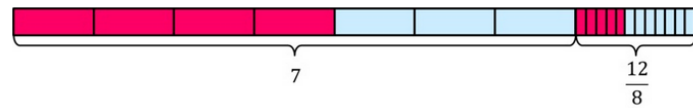
We can write the mixed numbers as a sum of a whole number and a fraction.

$$4\frac{5}{8} + 3\frac{7}{8} = (4 + \frac{5}{8}) + (3 + \frac{7}{8})$$



Since addition is commutative and associative, we can add the numbers in any order we wish. Let's add the whole numbers together and the fractions together.

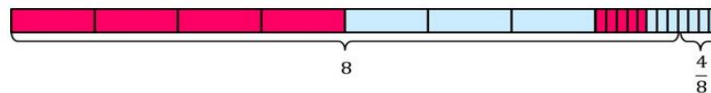
$$4 + \frac{5}{8} + 3 + \frac{7}{8} = 4 + 3 + \frac{5}{8} + \frac{7}{8}$$



$$4 + 3 + \frac{5}{8} + \frac{7}{8} = 7 + \frac{5+7}{8} = 7 + \frac{12}{8}$$

Next we can re-write $\frac{12}{8}$ as a mixed number...

$$7 + \frac{12}{8} = 7 + \frac{8+4}{8} = 7 + \frac{8}{8} + \frac{4}{8} = 7 + 1 + \frac{4}{8}$$



$$7 + 1 + \frac{4}{8} = 8 + \frac{4}{8}$$

Since $\frac{4}{8} = \frac{1}{2}$, we can write the sum as $8\frac{1}{2}$ gallons of punch.