



## Grade 5 - Unit C - Adding and Subtracting Fractions

### Unit Focus

In this unit, students add and subtract fractions with unlike denominators, using a variety of strategies to find common denominators. Money, clocks and double number lines serve to help students develop intuitions about finding common denominators in order to compare, add, and subtract fractions. Students are introduced to the use of ratio tables to rewrite fractions with common denominators. They extend these strategies and models to solving a variety of story problems, and make generalizations about finding common denominators. When using the double number line strategy, they multiply fractions by whole numbers in order to find distances on the number line. They create line plots involving fractional lengths and solve problems using the data displayed in the line plots. In addition, students learn to simplify fractions.

### Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer
<b>Standards</b> <ul style="list-style-type: none"><li>Common Core<ul style="list-style-type: none"><li><i>Mathematics: 5</i><ul style="list-style-type: none"><li>Use equivalent fractions as a strategy to add and subtract fractions.</li><li>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. For example, <math>\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}</math>. (In general, <math>\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}</math>.) (CCSS.MATH.CONTENT.5.NF.A.1)</li><li>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. For example, recognize an incorrect result <math>\frac{2}{5} + \frac{1}{2} = \frac{3}{7}</math>, by observing that <math>\frac{3}{7} &lt; \frac{1}{2}</math>. (CCSS.MATH.CONTENT.5.NF.A.2)</li><li>Apply and extend previous understandings of multiplication and division.</li><li>Interpret a fraction as division of the numerator by the denominator (<math>\frac{a}{b} = a \div b</math>). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret <math>\frac{3}{4}</math> as the result of dividing 3 by 4, noting that <math>\frac{3}{4}</math> multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size <math>\frac{3}{4}</math>. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie? (CCSS.MATH.CONTENT.5.NF.B.3)</li></ul></li></ul></li></ul>	<i>Students will be able to independently use their learning to...</i> <b>T1</b> Construct viable arguments using clear and appropriate mathematical language and critique the reasoning of others. <b>T2</b> Apply models to solve problems.
	Meaning
	Understanding(s)
	Essential Question(s)
	<i>Students will understand that...</i> <b>U1</b> Mathematicians construct viable arguments to explain problems, solutions, and mathematical representations. <b>U2</b> Mathematicians can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments. <b>U3</b> Mathematicians create or use models to generalize, represent, and solve problems.
	<i>Students will keep considering...</i> <b>Q1</b> Have I sufficiently supported my answer and shown my work? <b>Q2</b> How can I strengthen my argument and reasoning? <b>Q3</b> What model best represents this problem?
	Acquisition of Knowledge and Skill
	Knowledge
	Skill(s)
	<i>Students will know...</i> <b>K1</b> how to add/subtract fractions with unlike denominators <b>K2</b> how to find equivalent fractions
	<i>Students will be skilled at...</i> <b>S1</b> adding and subtracting fractions (including mixed numbers) with uncommon denominators

## Stage 1: Desired Results - Key Understandings

- Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. (*CCSS.MATH.CONTENT.5.NF.B.4*)
- 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  $a \times q \div b$ . For example, use a visual fraction model to show  $(2/3) \times 4 = 8/3$ , and create a story context for this equation. Do the same with  $(2/3) \times (4/5) = 8/15$ . (In general,  $(a/b) \times (c/d) = ac/bd$ .) (*CCSS.MATH.CONTENT.5.NF.B.4A*)
- Represent and interpret data.
- Make a line plot to display a data set of measurements in fractions of a unit ( $1/2, 1/4, 1/8$ ). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally. (*CCSS.MATH.CONTENT.5.MD.B.2*)
- Mathematical Practices
- Construct viable arguments and critique the reasoning of others. (*CCSS.MATH.MP.3*)
- Model with mathematics. (*CCSS.MATH.MP.4*)

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Analyzing: Examining information/data/evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (*POG.1.2*)

**K3** how to use various models/strategies when calculating with fractions (money model, clock model, double number line, ratio table)

**K4** Vocabulary: denominator, equivalent fractions, numerator, improper fraction, mixed number, simplest form (lowest terms), factor, multiple, unit fraction, greatest common factor, least common multiple, sum, difference

**K5** how to simplify a fraction

**S2** adding three fractions (including mixed numbers)

**S3** recognizing equivalent fractions

**S4** finding a unit fraction of a whole number (example  $\frac{1}{3}$  of 27)

**S5** finding a fraction of a whole number

**S6** placing fractions on a number line

**S7** using models such as clocks, money and double number lines to add/subtract fractions

**S8** changing a mixed number to an improper fraction and vice versa

**S9** recognizing simplified fractions