

<p>Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.</p>	
<p>Content Domain: Number and Operations—Fractions</p>	
<p>Target E [m]: Use equivalent fractions as a strategy to add and subtract fractions. (DOK 1, 2)</p> <p>Tasks associated with this target ask students to add and subtract fractions with unlike denominators, including mixed numbers. Contextual word problems that ask students to apply these operations should be included (often paired with one or more targets from Claim 2). Other tasks should focus on the reasonableness of answers to addition and subtraction problems involving fractions, often by presenting “flawed reasoning” (paired with one or more targets from Claim 3).</p>	
<p>Standards: 5.NF.A.1, 5.NF.A.2</p>	<p>5.NF.A Use equivalent fractions as a strategy to add and subtract fractions.</p> <p>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. <i>For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)</i></p> <p>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. <i>For example, recognize an incorrect result $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$, by observing that $\frac{3}{7} < \frac{1}{2}$.</i></p>
<p>Related Below-Grade and Above-Grade Standards for Purposes of Planning for Vertical Scaling:</p> <p>4.NF.A, 4.NF.A.1, 4.NF.A.2, 4.NF.B, 4.NF.B.3, 4.NF.B.3a, 4.NF.B.3b, 4.NF.B.3c, 4.NF.B.3d</p>	<p>Related Grade 4 Standards</p> <p>4.NF.A Extend understanding of fraction equivalence and ordering.</p> <p>4.NF.A.1 Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{n \times a}{n \times b}$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.</p> <p>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 $\frac{1}{2}$. 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.</p> <p>4.NF.B Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.</p> <p>4.NF.B.3 Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of</p>

	<p>fractions $1/b$.</p> <p>a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.</p> <p>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. <i>Examples:</i> $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2\ 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.</p> <p>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.</p> <p>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.</p> <p>Related Grade 6 Standards None</p>
DOK Level(s):	1, 2
Achievement LEVEL Descriptors:	
<p>RANGE Achievement Level Descriptor (Range ALD)</p> <p>Target E: Use equivalent fractions as a strategy to add and subtract fractions.</p>	<p>Level 1 Students should be able to add two fractions and mixed numbers with unlike denominators and subtract two fractions with unlike denominators when one denominator is a factor of the other in mathematical problems (denominators < 12). They should be able to use benchmark fractions ($1/4$s and $1/2$s) and number sense with fractions to estimate mentally and assess the reasonableness of answers.</p>
	<p>Level 2 Students should be able to add fractions and mixed numbers with unlike denominators (denominators ≤ 12) in mathematical problems, subtract a mixed number from a whole number (denominators up to 4), and use benchmark fractions to estimate mentally and assess the reasonableness of answers (denominators ≤ 12).</p>
	<p>Level 3 Students should be able to add and subtract fractions and mixed numbers with unlike denominators in word problems and use number sense of fractions to estimate mentally and assess the reasonableness of answers.</p>
	<p>Level 4 No Descriptor</p>
Evidence Required:	<ol style="list-style-type: none"> The student adds or subtracts fractions with unlike denominators (including mixed numbers) by using visual fraction models or equations to represent the problem. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers).
Allowable Response Types:	Multiple Choice, single correct response; Equation/Numeric; Fill-in Table
Allowable Stimulus Materials:	visual fraction models, equations
Construct-Relevant Vocabulary:	equivalent fractions, denominators, numerators, mixed numbers
Allowable Tools:	None
Target-Specific	None

Attributes:	
Non-Targeted Constructs:	None
Accessibility Guidance:	<p>Item writers should consider the following Language and Visual Element/Design guidelines¹ when developing items.</p> <p>Language Key Considerations:</p> <ul style="list-style-type: none"> • Use simple, clear, and easy-to-understand language needed to assess the construct or aid in the understanding of the context • Avoid sentences with multiple clauses • Use vocabulary that is at or below grade level • Avoid ambiguous or obscure words, idioms, jargon, unusual names and references <p>Visual Elements/Design Key Considerations:</p> <ul style="list-style-type: none"> • Include visual elements only if the graphic is needed to assess the construct or it aids in the understanding of the context • Use the simplest graphic possible with the greatest degree of contrast, and include clear, concise labels where necessary • Avoid crowding of details and graphics <p>Items are selected for a student's test according to the blueprint, which selects items based on Claims and targets, not task models. As such, careful consideration is given to making sure fully accessible items are available to cover the content of every Claim and target, even if some item formats are not fully accessible using current technology.²</p>
Development Notes:	Items that ask students to write an equation that represents a word problem (5.NF.2) will be assessed in Claim 4.

¹ For more information, refer to the General Accessibility Guidelines at:

<http://www.smarterbalanced.org/wordpress/wp-content/uploads/2012/05/TaskItemSpecifications/Guidelines/AccessibilityandAccommodations/GeneralAccessibilityGuidelines.pdf>

² For more information about student accessibility resources and policies, refer to

http://www.smarterbalanced.org/wordpress/wp-content/uploads/2014/08/SmarterBalanced_Guidelines.pdf

<p>Task Model 1a</p> <p>Response Type: Equation/Numeric</p> <p>DOK Level 1</p> <p>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. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)</i></p> <p>Evidence Required: 1. The student adds or subtracts fractions with unlike denominators (including mixed numbers) by using visual fraction models or equations to represent the problem.</p> <p>Tools: None</p>	<p>Prompt Features: The student is prompted to identify the correct sum of fractions in a mathematical context.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Item difficulty can be adjusted via these example methods: <ul style="list-style-type: none"> ○ The use of proper fractions, improper fractions, and mixed numbers ○ Fractions with denominators of 10 and 100 ○ Fractions with denominators where one denominator is a factor of the other ○ Fractions with unlike denominators that are not factors of each other ○ Items that require regrouping <p>TM1a Stimulus: The student is presented with an addition problem involving fractions with unlike denominators.</p> <p>Example Stem 1: Enter the sum. $\frac{2}{10} + \frac{30}{100}$</p> <p>Example Stem 2: Enter the sum. $\frac{8}{6} + \frac{3}{12}$</p> <p>Example Stem 3: Enter the sum. $\frac{3}{4} + 1\frac{3}{5}$</p> <p>Rubric: (1 point) The student enters the correct sum (e.g., $\frac{50}{100}$ or $\frac{5}{10}$ or $\frac{1}{2}$; $\frac{19}{12}$ or $1\frac{7}{12}$; $\frac{47}{20}$ or $2\frac{7}{20}$). Allow for equivalencies.</p> <p>Response Type: Equation/Numeric</p>
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<p>Task Model 1b</p> <p>Response Type: Equation/Numeric</p> <p>DOK Level 1</p> <p>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. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)</i></p> <p>Evidence Required: 1. The student adds or subtracts fractions with unlike denominators (including mixed numbers) by using visual fraction models or equations to represent the problem.</p> <p>Tools: None</p>	<p>Prompt Features: The student is prompted to identify the correct difference of fractions in a mathematical context.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Item difficulty can be adjusted via these example methods: <ul style="list-style-type: none"> ○ The use of proper fractions, improper fractions, and mixed numbers ○ Fractions with denominators of 10 and 100 ○ Fractions with denominators where one denominator is a factor of the other ○ Fractions with unlike denominators that are not factors of each other ○ Items that require regrouping <p>TM1b Stimulus: The student is presented with a subtraction problem involving fractions with unlike denominators.</p> <p>Example Stem 1: Enter the difference. $\frac{6}{10} - \frac{20}{100}$</p> <p>Example Stem 2: Enter the difference. $\frac{15}{12} - \frac{3}{4}$</p> <p>Example Stem 3: Enter the difference. $2\frac{7}{9} - \frac{3}{8}$</p> <p>Rubric: (1 point) The student correctly calculates the solution to a subtraction problem involving fractions (e.g., $\frac{40}{100}$ or $\frac{4}{10}$ or $\frac{2}{5}$, $\frac{6}{12}$ or $\frac{1}{2}$, $\frac{173}{72}$ or $2\frac{29}{72}$).</p> <p>Response Type: Equation/Numeric</p>
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<p>Task Model 2a</p> <p>Response Type: Multiple Choice, single correct response</p> <p>DOK Level 2</p> <p>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. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)</i></p> <p>Evidence Required: 2. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers).</p> <p>Tools: None</p>	<p>Prompt Features: The student is prompted to identify the set of steps which correctly find the sum or difference of fractions with unlike denominators.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Item difficulty can be adjusted via these example methods: <ul style="list-style-type: none"> ○ The use of proper fractions, improper fractions, and mixed numbers ○ Fractions with denominators of 10 and 100 ○ Fractions with denominators where one denominator is a factor of the other ○ Fractions with unlike denominators that are not factors of each other <p>TM2a Stimulus: The student is presented with an addition or subtraction expression involving fractions with unlike denominators.</p> <p>Example Stem: Which example shows a correct strategy and solution for subtracting $1\frac{3}{4} - \frac{1}{3}$.</p> <p>A. $\frac{3}{4 \times 3} - \frac{1}{3 \times 4}$ $= \frac{3}{12} - \frac{1}{12}$ $= \frac{2}{12} = \frac{1}{6}$</p> <p>B. $\frac{7}{4 \times 3} - \frac{1}{3 \times 4}$ $= \frac{7}{12} - \frac{1}{12}$ $= \frac{6}{12} = \frac{1}{2}$</p> <p>C. $\frac{7 \times 3}{4 \times 3} - \frac{1 \times 4}{3 \times 4}$ $= \frac{21}{12} - \frac{4}{12}$ $= \frac{17}{12} = 1\frac{5}{12}$</p> <p>D. $\frac{7 \times 3}{4 \times 3} - \frac{1 \times 3}{3 \times 4}$ $= \frac{21}{12} - \frac{3}{12}$ $= \frac{18}{12} = 1\frac{6}{12} = 1\frac{1}{2}$</p> <p>Rubric: (1 point) The student selects the correct set of steps (e.g., C).</p> <p>Response Type: Multiple Choice, single correct response</p>
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<p>Task Model 2b-c</p> <p>Response Type: Multiple Choice, single correct response</p> <p>DOK Level 1</p> <p>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. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)</i></p> <p>Evidence Required: 2. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers).</p> <p>Tools: None</p>	<p>Prompt Features: The student is prompted to identify an equivalent expression with like denominators that produced an equivalent sum or difference of fractions with unlike denominators.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Item difficulty can be adjusted via these example methods: <ul style="list-style-type: none"> ○ The use of proper fractions, improper fractions, and mixed numbers ○ Fractions with denominators of 10 and 100 ○ Fractions with denominators where one denominator is a factor of the other ○ Fractions with unlike denominators that are not factors of each other <p>TM2b Stimulus: The student is presented with a real-world addition problem involving fractions with unlike denominators.</p> <p>Example Stem: David used $2\frac{1}{4}$ feet of cloth to make a shirt. He also used $3\frac{1}{3}$ feet to make a scarf. Which expression could be used to correctly determine the amount of cloth, in feet, David used altogether?</p> <p>A. $5 + \frac{1}{12}$ B. $5 + \frac{2}{7}$ C. $2 + 3 + \frac{1}{12} + \frac{1}{12}$ D. $2 + 3 + \frac{3}{12} + \frac{4}{12}$</p> <p>TM2c Stimulus: The student is presented with a real-world subtraction problem involving fractions with unlike denominators.</p> <p>Example Stem: Sara has $1\frac{3}{4}$ feet of cloth. She used $\frac{1}{3}$ foot to make a bow. Which expression could be used to correctly determine the amount of cloth, in feet, that remains?</p> <p>A. $1 - \frac{3}{12} - \frac{1}{12}$ B. $1 - \frac{9}{12} - \frac{4}{12}$ C. $1 + \frac{3}{12} - \frac{1}{12}$ D. $1 + \frac{9}{12} - \frac{4}{12}$</p> <p>Rubric: (1 point) The student selects the correct equivalent expression (e.g., D; D).</p> <p>Response Type: Multiple Choice, single correct response</p>
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<p>Task Model 2d</p> <p>Response Type: Multiple Choice, single correct response</p> <p>DOK Level 1</p> <p>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. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)</i></p> <p>Evidence Required: 2. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers).</p> <p>Tools: None</p>	<p>Prompt Features: The student is prompted to identify an expression that can be used to find the solution to the given expression.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Item difficulty can be adjusted via these example methods: <ul style="list-style-type: none"> ○ The use of proper fractions, improper fractions, and mixed numbers ○ Fractions with denominators of 10 and 100 ○ Fractions with denominators where one denominator is a factor of the other ○ Fractions with unlike denominators that are not factors of each other <p>TM2d Stimulus: The student is presented with an addition or subtraction expression involving fractions with unlike denominators.</p> <p>Example Stem 1: Which expression is equivalent to $2 - \frac{1}{3} + \frac{2}{5}$?</p> <p>A. $\frac{2}{15} - \frac{1}{15} + \frac{2}{15}$ C. $\frac{17}{15} - \frac{7}{15} + \frac{8}{15}$</p> <p>B. $\frac{2}{15} - \frac{5}{15} + \frac{6}{15}$ D. $\frac{30}{15} - \frac{5}{15} + \frac{6}{15}$</p> <p>Rubric: (1 point) The student selects the correct expression (e.g., D).</p> <p>Response Type: Multiple Choice, single correct response</p>
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<p>Task Model 2e</p> <p>Response Type: Equation/Numeric</p> <p>DOK Level 2</p> <p>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. <i>For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)</i></p> <p>Evidence Required: 2. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers).</p> <p>Tools: None</p>	<p>Prompt Features: The student is prompted to enter the unknown number in an equation used to solve an addition or subtraction problem involving fractions.</p> <p>Stimulus Guidelines:</p> <ul style="list-style-type: none"> • Item difficulty can be adjusted via these example methods: <ul style="list-style-type: none"> ○ The use of proper fractions, improper fractions, and mixed numbers ○ Fractions with denominators of 10 and 100 ○ Fractions with denominators where one denominator is a factor of the other ○ Fractions with unlike denominators that are not factors of each other <p>TM2e Stimulus: The student is presented with a fraction equation showing equivalent fractions used to add or subtract fractions with unlike denominators.</p> <p>Example Stem 1: Enter the numerator that makes the equation true.</p> $1\frac{3}{4} + 1\frac{1}{3} = 1\frac{\square}{12} + 1\frac{4}{12}$ <p>Example Stem 2: Enter the numerator that makes the equation true.</p> $1\frac{3}{4} + 1\frac{1}{3} = 1 + 1 + \frac{\square}{12} + \frac{4}{12}$ <p>Rubric: (1 point) The student enters the number that will make the equation true (e.g., 9; 9).</p> <p>Response Type: Equation/Numeric</p>
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