Task Model 1a **Response Type: Equation/Numeric** **DOK Level 1** **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. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)* **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. **Tools:** None	**Prompt Features:** The student is prompted to identify the correct sum of fractions in a mathematical context. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: ○ 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 **TM1a** **Stimulus:** The student is presented with an addition problem involving fractions with unlike denominators. **Example Stem 1:** Enter the sum. $\frac{2}{10} + \frac{30}{100}$ **Example Stem 2:** Enter the sum. $\frac{8}{6} + \frac{3}{12}$ **Example Stem 3:** Enter the sum. $\frac{3}{4} + 1\frac{3}{5}$ **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. **Response Type:** Equation/Numeric

Task Model 1b **Response Type: Equation/Numeric** **DOK Level 1** **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. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)* **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. **Tools:** None	**Prompt Features:** The student is prompted to identify the correct difference of fractions in a mathematical context. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: ○ 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 **TM1b** **Stimulus:** The student is presented with a subtraction problem involving fractions with unlike denominators. **Example Stem 1:** Enter the difference. $\frac{6}{10} - \frac{20}{100}$ **Example Stem 2:** Enter the difference. $\frac{15}{12} - \frac{3}{4}$ **Example Stem 3:** Enter the difference. $2\frac{7}{9} - \frac{3}{8}$ **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 $2\frac{29}{72}$). **Response Type:** Equation/Numeric

Task Model 2a **Response Type:** **Multiple Choice, single correct response** **DOK Level 2** **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. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)* **Evidence Required:** 2. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers). **Tools:** None	**Prompt Features:** The student is prompted to identify the set of steps which correctly find the sum or difference of fractions with unlike denominators. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: ○ 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 **TM2a** **Stimulus:** The student is presented with an addition or subtraction expression involving fractions with unlike denominators. **Example Stem:** Which example shows a correct strategy and solution for subtracting $1\frac{3}{4} - \frac{1}{3}$. A. $\frac{3}{4\times3} - \frac{1}{3\times4}$ $= \frac{3}{12} - \frac{1}{12}$ $= \frac{2}{12} = \frac{1}{6}$ B. $\frac{7}{4\times3} - \frac{1}{3\times4}$ $= \frac{7}{12} - \frac{1}{12}$ $= \frac{6}{12} = \frac{1}{2}$ C. $\frac{7\times3}{4\times3} - \frac{1\times4}{3\times4}$ $= \frac{21}{12} - \frac{4}{12}$ $= \frac{17}{12} = 1\frac{5}{12}$ D. $\frac{7\times3}{4\times3} - \frac{1\times3}{3\times4}$ $= \frac{21}{12} - \frac{3}{12}$ $= \frac{18}{12} = 1\frac{6}{12} = 1\frac{1}{2}$ **Rubric:** (1 point) The student selects the correct set of steps (e.g., C). **Response Type:** Multiple Choice, single correct response

Task Model 2b-c **Response Type:** **Multiple Choice, single correct response** **DOK Level 1** **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. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)* **Evidence Required:** 2. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers). **Tools:** None	**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. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: ○ 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 **TM2b** **Stimulus:** The student is presented with a real-world addition problem involving fractions with unlike denominators. **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? A. $5 + \frac{1}{12}$ B. $5 + \frac{2}{7}$ C. $2 + 3 + \frac{1}{12} + \frac{1}{12}$ D. $2 + 3 + \frac{3}{12} + \frac{4}{12}$ **TM2c** **Stimulus:** The student is presented with a real-world subtraction problem involving fractions with unlike denominators. **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? 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. $1 + \frac{9}{12} - \frac{4}{12}$ **Rubric:** (1 point) The student selects the correct equivalent expression (e.g., D; D). **Response Type:** Multiple Choice, single correct response

Task Model 2d **Response Type:** **Multiple Choice, single correct response** **DOK Level 1** **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. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)* **Evidence Required:** 2. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers). **Tools:** None	**Prompt Features:** The student is prompted to identify an expression that can be used to find the solution to the given expression. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: ○ 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 **TM2d** **Stimulus:** The student is presented with an addition or subtraction expression involving fractions with unlike denominators. **Example Stem 1:** Which expression is equivalent to $2-\frac{1}{3}+\frac{2}{5}$? A. $\frac{2}{15}-\frac{1}{15}+\frac{2}{15}$ C. $\frac{17}{15}-\frac{7}{15}+\frac{8}{15}$ B. $\frac{2}{15}-\frac{5}{15}+\frac{6}{15}$ D. $\frac{30}{15}-\frac{5}{15}+\frac{6}{15}$ **Rubric:** (1 point) The student selects the correct expression (e.g., D). **Response Type:** Multiple Choice, single correct response

Task Model 2e **Response Type:** **Equation/Numeric** **DOK Level 2** **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. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)* **Evidence Required:** 2. The student identifies and explains the use of equivalent fractions when adding or subtracting fractions with unlike denominators (including mixed numbers). **Tools:** None	**Prompt Features:** The student is prompted to enter the unknown number in an equation used to solve an addition or subtraction problem involving fractions. **Stimulus Guidelines:** • Item difficulty can be adjusted via these example methods: ○ 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 **TM2e** **Stimulus:** The student is presented with a fraction equation showing equivalent fractions used to add or subtract fractions with unlike denominators. **Example Stem 1:** Enter the numerator that makes the equation true. $1\frac{3}{4} + 1\frac{1}{3} = 1\frac{\square}{12} + 1\frac{4}{12}$ **Example Stem 2:** Enter the numerator that makes the equation true. $1\frac{3}{4} + 1\frac{1}{3} = 1 + 1 + \frac{\square}{12} + \frac{4}{12}$ **Rubric:** (1 point) The student enters the number that will make the equation true (e.g., 9; 9). **Response Type:** Equation/Numeric