

Core Content

Cluster Title: Use equivalent fractions as a strategy to add and subtract fractions

Standard 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. For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.

MASTERY Patterns of Reasoning:**Conceptual:**

Students can interpret word problems by using strategies (e.g., highlight key information, draw a picture).
Students can determine the reasonableness of an answer using estimation and benchmark fractions.

Procedural:

Students can set up an equation to represent the problem.
Students can convert fractions to equivalent fractions with like denominators.
Students can add or subtract fractions with like denominators.
Students can use estimation and benchmark fractions to check the reasonableness of the answer.

Representational:

Students can use concrete and pictorial models, including set models, area models, and linear models, and connect to numerical representations.

Supports for Teachers

Critical Background Knowledge**Conceptual:**

Students will understand basic problem-solving strategies.
Students will understand proper fractions, improper fractions, and mixed numbers.
Students will understand how to compare a fraction to a benchmark fraction.
Students will understand strategies to interpret and understand word problems.

Procedural:

Students can convert fractions with unlike denominators to equivalent fractions with like denominators.

Students can add and subtract fractions and mixed fractions with like denominators.
 Students can rename improper fractions and mixed numbers.

Representational:

Students can represent fractions with models including set models, area models, and linear models.

Academic Vocabulary and Notation

benchmark fractions, sum, difference, numerator, denominator, like denominators, unlike denominators, estimation, equivalent fractions

Instructional Strategies Used

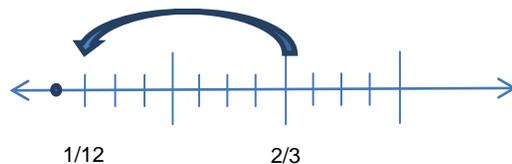
Use a word problem such as the following:

Julia was doing a science experiment in which she was comparing the heights of a bean plant at the start and end of a two-week time period. At the end of the two-week time period, the plant was $\frac{2}{3}$ of a foot tall. At the beginning of the time period, it was $\frac{1}{12}$ of a foot tall. How much did the plant grow over the two-week time period?

Ask the students to work in groups and estimate the answer. Then allow them to use either a linear model (with a number line) or a bar model to find the answer.

Examples:

Linear Model:



In this model, each tick mark represents $\frac{1}{12}$. By counting the tick marks,

Resources Used

<http://www.youtube.com/watch?v=eQa2S92ftNo&feature=related>

8 Step Model Drawing: Singapore's Best Problem-Solving Math Strategies by Bob Hogan and Char Forsten

Extensions:

<http://nrich.maths.org/2312>

<p>students determine that $\frac{2}{3} = \frac{8}{12}$. By counting backwards from $\frac{2}{3}$ students determine that the answer is $\frac{7}{12}$. So, creating the equation, $\frac{2}{3} - \frac{1}{12} =$</p> $\frac{8}{12} - \frac{1}{12} = \frac{7}{12}$	
Assessment Tasks Used	
<p>Skill-Based Task: Solve the problem with a visual model and equation. Also, use benchmark fractions to check the reasonableness of your answer.</p> <p>Claire took $2\frac{3}{4}$ hours to read a book. Her brother, Dan, took $\frac{2}{3}$ hour less to read his book. How much more time did Claire spend reading than Dan? Extension Question: How much time did they spend altogether reading their books?</p>	<p>Problem Task</p> <ol style="list-style-type: none"> 1. Create a word problem that could be solved by adding two specific fractions with unlike denominators. Example: $\frac{1}{2} + \frac{3}{4} =$ 2. Represent the problem using both a diagram and an equation. 3. Solve your problem. Show all your work. 4. Use benchmark fractions to explain how you know that your answer is reasonable.