Math Moments for 4th Grade

Adding and Subtracting Fractions

A unit fraction is a fraction with a numerator of one. When students investigate fractions other than unit fractions, such as 5/6, they should be able to decompose the non-unit fraction into a combination of several unit fractions. Given the fraction 5/6 it can be written as the sum of a unit fraction. i.e 5/6 = 1/6 + 1/6 + 1/6 + 1/6 + 1/6. It can also be decomposed as 5/6 = 3/6 + 2/6.

When students investigate fractions other than units fractions, such as 2/3, they should be able to join (compose) or separate (decompose) the fractions of the same whole.

Example: 2/3 = 1/3 + 1/3

Being able to visualize this decomposition into unit fractions helps students when adding or subtracting fractions. Students need multiple opportunities to work with mixed numbers and be able to decompose them in more than one way. Students may use visual models to help develop this understanding.

Example:
1 ¼ - ¾ = _____
4/4 + ¼ = 5/4
5/4 – ¾ = 2/4 or ½

Example of word problem:

Mary and Lacey decide to share a pizza. Mary ate 3/6 and Lacey ate 2/6 of the pizza. How much of the pizza did the girls eat together?
Possible solution: The amount of pizza Mary ate can be thought of 3/6 or 1/6 + 1/6 + 1/6. The amount of pizza Lacey ate can be thought of 1/6 + 1/6. The total amount of pizza they ate is 1/6 + 1/6 + 1/6 + 1/6 + 1/6 or 5/6 of the pizza. A fraction with a numerator of one is called a unit fraction.

Decomposing Mixed Fractions

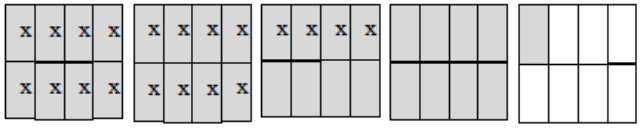
Students should also be able to decompose mixed fractions such as 2 ¾.

2 ¾ = 4/4 + 4/4 + ¼ + ¼ + ¼

Using Models:

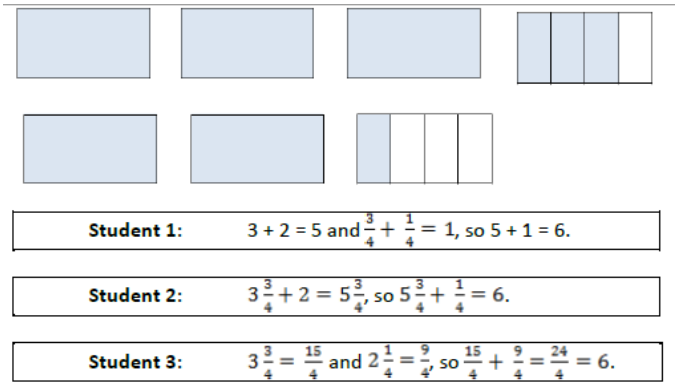
Example:
Trevor has 4 1/8 pizzas left over from his soccer party. After giving some pizza to his friend, he has 2 4/8 of a pizza left. How much pizza did Trevor give to his friend?

Solution: Trevor had 4 1/8 pizzas to start. This is 33/8 of a pizza. The x's show the pizza he has left which is 2 4/8 pizzas or 20/8 pizzas. The shaded rectangles without the x's are the pizza he gave to his friend which is 13/8 or 1 5/8 pizzas.



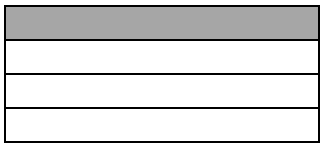
Mixed numbers are introduced for the first time in Fourth Grade. Students should have ample experiences of adding and subtracting mixed numbers where they work with mixed numbers or convert mixed numbers into improper fractions.

Example:
While solving the problem, 3 3/4 + 2 1/4 students could do the following:

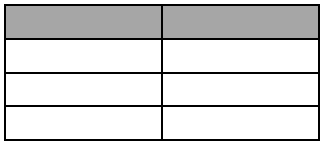


Equivalent Fractions

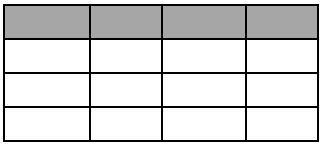
Students are asked to create a model for 1/4. So they draw the following model:



Students are then asked to make an equivalent fraction for 1/4. They do this by drawing a line through the middle. This gives them 2/8.

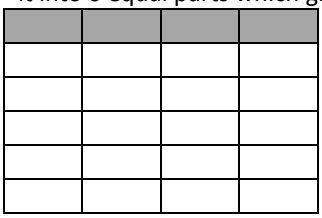


Students are then asked to make another equivalent fraction for ½. This time you draw two more lines (one on either side of the middle line they drew in the previous rectangle). This gives them 4/16.

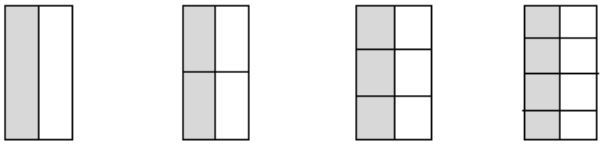


Students are then asked to create an equivalent fraction 1/4 = 6/?

Since you cannot split the drawing above evenly into sixths, you must re-draw the rectangle. Once redrawn you then split it into 6 equal parts which gives you 6/24.

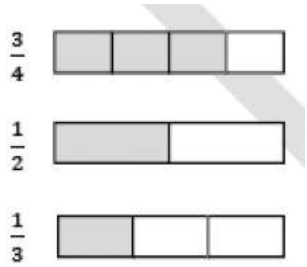


Students will begin to notice connections between the models and fractions in the way both the parts and wholes are counted. The rule should not be given to students after exploration students will begin to generate a rule for writing equivalent fractions.
1/2 x 2/2 = 2/4.



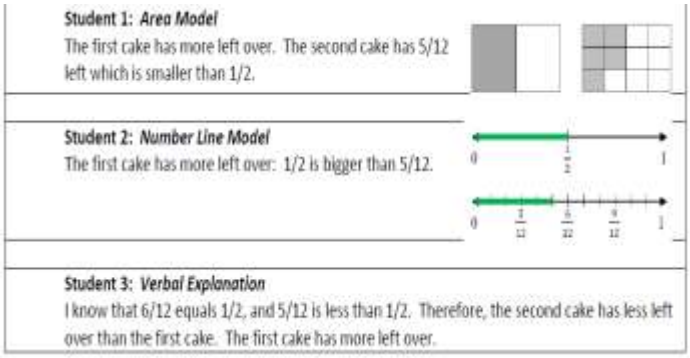
Comparing Fractions

Students extend their understanding of unit fractions to compare two fractions with different numerators and different denominators.
Students should use models to compare two fractions with different denominators by creating common denominators or numerators. The models should be the same (both fractions shown using fraction bars or both fractions using circular models) so that the models represent the same whole. The models should be represented in drawings. Students should also use benchmark fractions such as ½ to compare two fractions. The result of the comparisons should be recorded using >, < and = symbols.



Example:

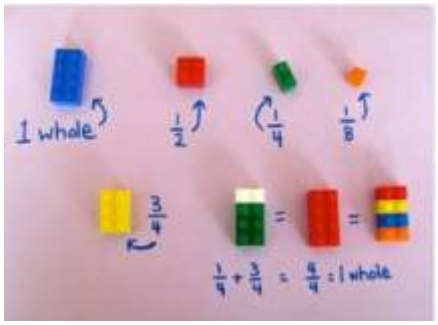
There are two cakes on the counter that are the same size. The first cake has 1/2 of it left. The second cake has 5/12 left. Which cake has more left?



Possible student thinking by creating common denominators:

- $\frac{5}{6} > \frac{1}{2}$ because $\frac{3}{6} = \frac{1}{2}$ and $\frac{5}{6} > \frac{3}{6}$

Making Fractions With Legos



Line Plots

Students will create line plots with fractions of a unit (1/2, 1/4, 1/8) and plot data showing multiple data points for each fraction. Students are making a line plot of this data.
Students measured objects in their desk to the nearest 1/2, 1/4, or 1/8 inch. They displayed their data collected on a line plot.