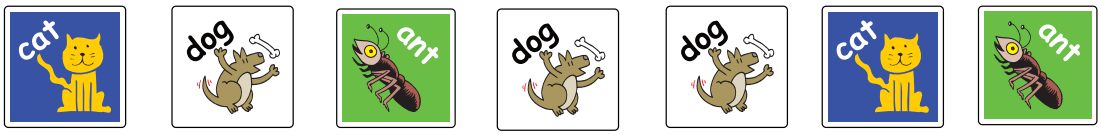
Adding Fractions

When adding fractions, many students will be tempted to add together the numerators AND the denominators as they see an addition sign in between the two fractions. Other students may easily remember and carry out the rule correctly for adding fractions but not understand or be able to explain why we do not add the denominators.

Before getting into the fractions, show them simple illustrations and ask them to count objects based on your descriptions. (These are dice faces from the LCOM Ant/Cat/Dog dice set but use whatever objects or images you have at hand!)



Q1: How many cats? A1: 2 cats. We don't count the other animals that are NOT cats
Q2: How many dogs? A2: 3 dogs. Emphasize they are still dogs (they didn't change because of counting)
Q3: How many mammals? A3: 5 count all of the dogs and cats, or add together 2 mammals + 3 mammals.

Emphasize: We do not count together things that are not the same – the description or category matters. We can only count together the cats and dogs if the categorization is "mammals". Likewise, if we asked how many animals? Then we count them all to get 7.

The secret lies in language and how we verbally say the math statement. Given the expression $\frac{5}{6}+\frac{3}{4}$

We want the students to hear, "five sixths and three fourths"
ALSO say "five of these things called sixths and three of these things called fourths."

What are we counting? This is just like two cats and three dogs. Sixths and Fourths are not the same thing so we cannot add the 5+3

Now go into "**Making change**" and remind them of what they learned in earlier grades about equivalent fractions. [While I don't show it below, do use the prime factorization method to find the LCD. The prime factor method will be the analogous model for adding rational expressions (algebraic fractions) in later grades.]

Ask: Can we make change and rewrite the fractions into different forms so that we can add?
Yes: LCD (LCM in earlier grades) is 12. We can make both fractions into "Twelfths"

$$\frac{2}{2}\cdot\frac{5}{6}+\frac{3}{4}\cdot\frac{3}{3} \quad \rightarrow \quad \frac{10}{12}+\frac{9}{12} \quad \rightarrow \quad \frac{19}{12} \text{ or } 1\frac{7}{12}$$

10 twelfths plus 9 twelfths is 19 twelfths. They are still twelfths just like cats are still cats.

Find the Counting. Find the Meaning.

Calvin Leung
Retired Secondary Math & Science Teacher | Elementary Principal
info@letscountonmath.com
YouTube: @LetsCountOnMath