Adding fractions with unlike denominators

Recall in the 2C book that we can add simple fractions by combining the numerators:

$$\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$$

This is because we are working with the same "size" of pieces: fifths. Then we are asking how many pieces we have if we add one piece to three pieces, which is four pieces.

But what if we have different sizes of pieces to add? Suppose we want to find

$$\frac{1}{2} + \frac{1}{4}$$

Then in order to add them, we need to first find a size of piece to work with. The first fraction has 2 equal pieces in a whole, while the second fraction has 4 equal pieces in a whole. By doubling the number of pieces in the first fraction, we will have 4 equal pieces in a whole! Then, we can use equivalent fractions to change to a common size, then add the simple fractions:

$$\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

Generally, the best "size" to use is a denominator which is a multiple of both denominators of the fractions we're adding, but as small as possible. (This is called the *least common multiple*, which we will talk about later) For example, 12 is the smallest multiple of both 4 and 6, so

$$\frac{3}{4} + \frac{5}{6} = \frac{9}{12} + \frac{10}{12} = \frac{19}{12}$$

You can also just multiply the denominators, since this is guaranteed to be a multiple of both:

$$\frac{3}{4} + \frac{5}{6} = \frac{18}{24} + \frac{20}{24} = \frac{38}{24} = \frac{19}{12}$$

Remember to simplify your answer!