# Diagrams and fractions – lesson 3.2 – Combining diagrams to add fractions

**Summary**

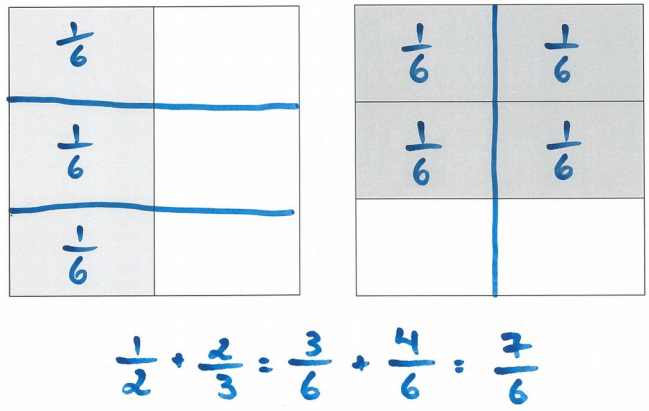
The goal of this lesson is to move away from the concrete pieces towards diagrams. The basic strategy that will be discussed is the combination of both diagrams in order to convert both fractions to the same denominator. This resource can even work as a model for multiplication (you can multiply two numbers by drawing the combined diagram and count the number of rectangles in it).

**Material:** worksheets and transparent sheet for demonstration under the visualizer.

## Outline of the lesson

### Starter

The starter is fundamental to achieve the goal of this lesson.




*Give some time to the students have a go with these questions. However, it is expected that many of them may not have developed a strategy that works without the pieces.*
*During the discussion, you should emphasize how the diagrams can be combined in order to obtain the same division in both. It will be provided a transparent sheet that can be used to show the combination of the diagrams (you may place it over the first diagram and copy it, then over the second and copy the internal lines, resulting in a new diagram that fits both original diagrams).*
*After solving the first question, you may give them some time to solve the second and, then, discuss it with the whole class.*

### Task 1

This question is the first step away from the concrete pieces. At this point, they will have ready-to-use diagrams to help them.

*You may explain that they are expected to write down the sum shown in the diagrams, the equivalent fractions (as shown in the first question) and the final answer (in the third column).*

### Task 2

Now, the students will have to produce their own diagrams or use some numerical strategy.

*If a student is able to solve the questions without a diagram, it is OK. However, it is expected that most of them will continue using diagrams as a reference for their thinking.*
*The diagrams may be useful not only to register the steps, reducing the working memory load, but also helping them to perform the multiplications and additions necessary to solve the questions.*

### Extension

It is expected that the students that get to this point will be able to solve the sums ( $\frac{1}{8}+\frac{1}{10}$ and $\frac{5}{12}+\frac{3}{8}$ )

without relying too much on the diagrams, which means anticipating the common denominator without counting every single rectangle in the diagram. If not, ask them how they could do that. If you need even more questions, pose the sums below.

**Work out the sums below:**

$\frac{1}{4}+\frac{1}{3}+\frac{1}{12}$ $\frac{1}{4}+\frac{1}{9}$ $\frac{7}{10}+\frac{2}{3}$ $\frac{3}{8}-\frac{1}{3}$