

Factor

Fractions: Lesson 4

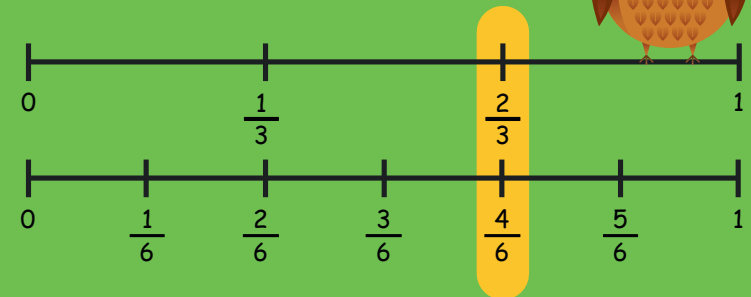
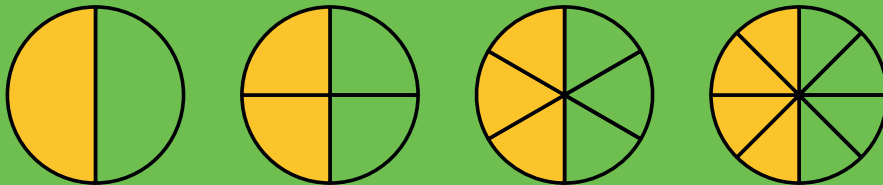
Multiple

Common Denomination: more adding and subtracting

Maths KS2 Years 5 and 6

Highest
common
factor

Numerator



Maths Lesson 4: Fractions

Common Denomination: more adding and subtracting

Maths

Key Stage 2
Years 5 and 6

Learning Objectives

To deepen understanding:

- in order to add related fractions, first convert one fraction so that both share the same denominator (a 'common denominator')
- to subtract related fractions, first convert one fraction so that both share a common denominator
- the common denominator method can be extended to adding and subtracting non-unit related fractions

Curriculum Link

- to solve problems that involve fractions

Keywords from Lesson 1, 2 and 3

Equivalent fractions. Denominator. Numerator. Factor. Multiple. Highest common factor.

Keywords for Lesson 4

Common denominator.

This can also be found in printable format at the end of this PDF.



You will need the following resources for this lesson:

- Pupil whiteboards and pens, or else notebook and pens
- Handout 1 (for Activity 1) Matching Fractions Cards
- Handout 2 (for Activity 2) Sorting Cards
- Handout 3 (for Activities 3 and 4) Fractions Cards

PowerPoint presentation

The accompanying PowerPoint has 11 slides with the following learning points:

- Slides 1 and 2 introduce the lesson and the learning aims.
- Slide 3 is the introduction to the lesson which considers when adding related fractions, how to convert one fraction so that both share the same denominator, known as a common denominator.

When you show slide 3, provide a story context to allow children to get a feel for calculation.

Explain that Jay has decided to paint his bedroom wall. First, he paints $\frac{1}{2}$ of the wall red, then he paints $\frac{1}{4}$ of the wall blue.

Ask children to discuss in pairs:

- What fraction of the wall does he still need to paint?
- What fraction of the wall has he already painted?

For the first question (how much is left to paint), they may be able to see that there is a quarter remaining to paint and should be able to explain why.

For the question asking how much of the wall has been painted, you can emphasise how it is difficult to see because **we do not have equal parts to add together.** However, you can remind the children that that $\frac{1}{2}$ and $\frac{1}{4}$ belong to the same fraction family.

$\frac{1}{2}$ is the same as how many quarters?

The slide is animated to show the steps, and you may wish to use Cuisenaire rods, alongside the symbolic representations to support this, as shown on the slide.

Now the fractions have equal parts so we can add them together.

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



- Slide 4 introduces Activity 1, which is a matching card game, using unit fractions. Ask the children to match pairs of fractions, identifying those that are related whilst noticing those that are not related.

The two stem sentences are on the slide, and they are colour-matched to the 2 examples of fractions.

Read the stem sentence together and ensure children are confident using the language of factor or multiple and identifying them correctly within the fraction pairs.

$\frac{1}{2}$ and $\frac{1}{4}$ are related fractions because the first denominator is ____ and this is a multiple/factor of the second denominator which is ____.

Repeat showing the second fraction pair which are not related. There is a stem sentence for this also.

Leave the stem sentence on the interactive whiteboard to support children with using the correct language as they complete this activity.

Timing: Allow approximately 10 minutes for this activity.

- Slide 5: on showing this slide, start by asking children about the two fractions on the slide. You could ask questions such as:

- Which of the two fractions is the largest? How do you know?
- How might these two fractions look on a number line?
- Is the sum of these two fractions going to be greater/less than $\frac{1}{4}$, greater/less than $\frac{1}{2}$, how do you know?
- Why are these fractions related?

There is a number line on the slide, and you may wish to invite a child to come out and draw where $\frac{1}{3}$ and $\frac{1}{12}$ would lie on the numberline.

The stem sentence is also repeated on this slide.

As these fractions are related, talk about how to decide which of the fractions to convert using a common denominator.

For example, you may say that $\frac{1}{3}$ could be converted into twelfths, but $\frac{1}{12}$ could not be converted into thirds.

Now model how to convert the fraction and emphasise how one of the fractions is staying the same so that both fractions have the same denominator and therefore have been divided into the same number of equal parts. This is called a **common denominator**.

- Slide 6 models how these two fractions can be added together to reach the total $\frac{5}{12}$.

You may decide to show a couple of further examples on the interactive whiteboard such as $\frac{1}{5} + \frac{1}{10}$ and $\frac{1}{6} + \frac{1}{3}$.

Timing: Allow approximately 15 minutes for this.



- Slide 7 considers considers how the common denominator method can be extended to adding non-unit related fractions.

Explain that Jay has been practicing adding fractions together. Ask the children to explain how Jay has added the two fractions together.

Now ask if they can spot the mistake Jay has made.

For this activity there are non-unit fractions. You may wish to demonstrate how to convert these into equivalent fractions in the same way as unit fractions.

Now give out Handout 2 for Activity 2, which is a card sort where the children, in pairs, sort which questions are correct and which are incorrect, explain how they know, and what the correct answer is.

Timing: Allow approximately 10 minutes for this.

- Slide 8 is an additional challenge, **Activity 3**, which you may choose to use to remind children that fractions can be greater than one whole.

There is a number line on the slide, to support children with their reasoning.

You may also wish to provide children with sentence starters such as:

- I think that _____ because _____
- I have noticed that _____ because _____
- Because _____ and _____ are greater than _____ then
- Because _____ are equal to _____ then

Give children Handout 3, fractions cards, as they reason which of the fractions, added together, will give them a total greater than 1 and close to $1\frac{1}{4}$.

Some children may spot that by using three fraction cards they can make a whole and then just need to add the half, however the possible answers with two cards are

$$\frac{1}{2} + \frac{3}{4}, \frac{4}{8} + \frac{3}{4}, \frac{3}{8} + \frac{7}{8}$$

Timing: Allow approximately 10 minutes for this.



The plenary starts on slide 9.

- Slide 9 moves on to consider how to subtract related fractions, by first converting one fraction so that both share a common denominator.

Start by reminding children to firstly consider whether the fractions are related or not.

The stem sentence, from the start of the lesson, is repeated on the slide.

Now model how to convert the fraction and reiterate how one of the fractions is staying the same so that both fractions have a common denominator, just as for addition, which would be twelfths. Now the calculation can be completed with $\frac{4}{12}$ minus $\frac{1}{12}$ to leave a difference of $\frac{3}{12}$

You could use Cuisenaire rods, or the Cuisenaire images, to deepen understanding here.

Activity 4

- Slide 10 is a challenge activity. Give the children the fractions, Handout 3.
Ask the children, in pairs, to select two fraction cards and to discuss which is the larger of the fractions. You could ask them to draw an empty numberline on their whiteboards and then to place their fractions on this. They may need to choose a common denominator.
They can then subtract the smaller fraction from the larger one.
- Slide 11 is a review slide for you to annotate on your interactive whiteboard or to collect what children reflect they have been learning about.

The coloured underlined ideas are the key ideas from this lesson. They indicate opportunities for pupil talk indicated throughout the PowerPoint.



Handout 1 for Activity 1: Matching Fractions



$\frac{1}{3}$	$\frac{1}{12}$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{7}$	$\frac{1}{2}$
$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{5}$	$\frac{1}{9}$	$\frac{1}{3}$
$\frac{1}{8}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{15}$	$\frac{1}{5}$



Handout 2 for Activity 2: Sorting Cards



$$\frac{3}{5} + \frac{3}{10} = \frac{6}{10}$$

$$\frac{2}{5} + \frac{4}{10} = \frac{6}{5}$$

$$\frac{3}{6} + \frac{1}{3} = \frac{5}{6}$$

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

$$\frac{2}{6} + \frac{2}{3} = \frac{4}{3}$$

$$\frac{3}{4} + \frac{1}{8} = \frac{7}{8}$$



Handout 3 for Activities 3 and 4



$\frac{1}{2}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{3}{8}$
$\frac{5}{8}$	$\frac{7}{8}$	$\frac{4}{8}$	$\frac{2}{8}$



Fractions: Keywords Flashcards



**Equivalent
fractions**

Denominator

Numerator

Factor

Multiple

**Highest
common
factor**

**Common
denominator**



Common denominator

