

Factor

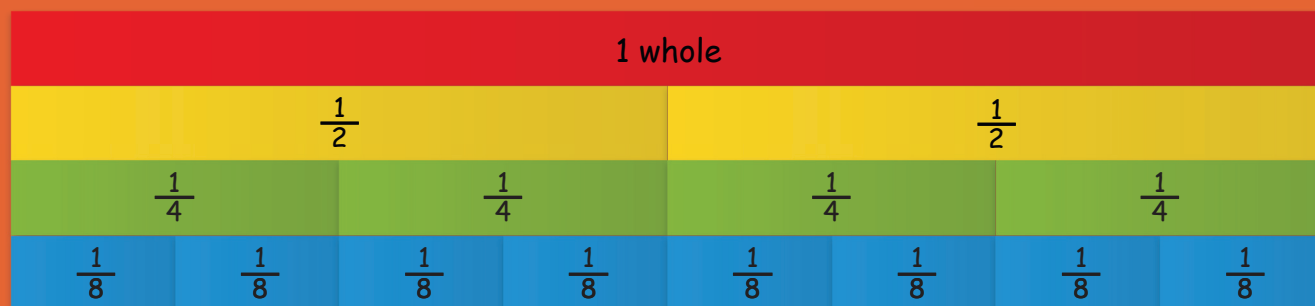
Fractions: Lesson 3

Multiple

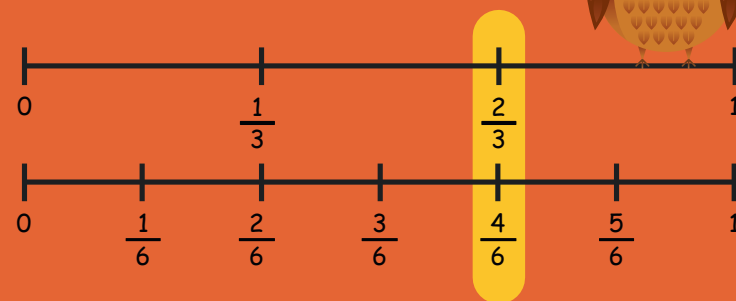
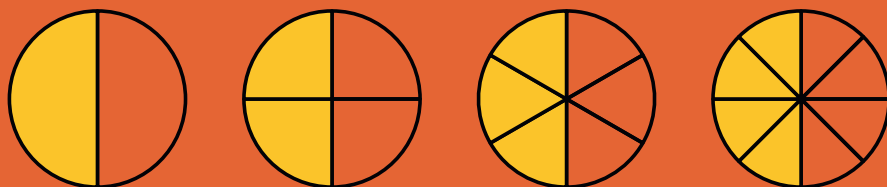
Simplifying Equivalent Fractions

Maths KS2 Years 5 and 6

Dividing
bar



Equal
parts



Maths Lesson 3: Fractions

Simplifying Equivalent Fractions

Maths

Key Stage 2 Years 5 and 6

Learning Objectives

To deepen understanding about:

- the multiplicative relationship between the numerators and the denominators of equivalent fractions
- how to reduce a fraction to its simplest form

Curriculum Link

- to solve problems that involve fractions

Keywords from Lesson 1 and 2

Fraction. Denominator. Numerator. Equivalent fractions. Scale factor.

Keywords for Lesson 3

Simplify. Factor. Multiple. Highest common factor.

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

simplify

Factor

**Highest
common
factor**

Multiple



You will need the following resources for this lesson:

- Activity 1: Pupil whiteboards and pens (or pen and paper), 1-12 dice, mini wipeable 100 squares or Handout 1.
- Activity 2: True or false cards Handout 2.
- Activity 3: Highest Common Factor Loop card game, Handout 3 and blank cards, Handout 4.
- Activity 4: Sorting cards. Handout 5, Venn hoops or PE hoops, two per group.

PowerPoint presentation

The accompanying PowerPoint has 13 slides with the following learning points:

- Slides 1 and 2 introduce the lesson and the learning aims.
The introduction considers the multiplicative relationship between the numerators and the denominators of equivalent fractions.
- Slide 3: show slide 3 and ask the children in pairs to discuss what the missing fraction parts might be.
Show the stem sentence, '**the numerator and the denominator have been scaled by a factor of ____**' and remind the children to identify the scale factor and then read the stem sentence together.
Now ask the children to tell you the missing fractions and to explain how they know.
The second stem sentence on the slide should help structure the children's thinking.
I know it must be ____ because the denominator is ____ times the numerator.
Now click again on the slide and show the further reasoning question to probe children's understanding:
What would happen if we kept on going?
Allow the children to discuss this in pairs.
What other equivalent fractions can you think of?
How do you know?
e.g. someone might say $\frac{1000}{7000}$ or $\frac{1000000}{7000000}$.
Record their ideas on your interactive whiteboard.
- Slide 4 introduces the information for Activity 1.
Show the multiplication square and ask the children what they notice about the highlighted rows. They should make links to the previous slide, as this shows the equivalent fractions for one seventh. You can emphasise the relationship as the scale factor between the numerator and the denominator is 7.



- Slide 5 continues to model this but with a non-unit fraction. Ask the children, in pairs, to work out an explanation for what is happening between each of the fractions. They should notice that as the numerator is multiplied by 2 the denominator is also multiplied by 2, therefore three-fifths becomes six-tenths.
When the numerator is multiplied by 3 the denominator is also multiplied by 3.

Activity 1

- Slide 6: Give pairs of children a dice (12-sided, if possible, but a 1-9 dice would also work), a whiteboard and a multiplication grid, (Handout 1 has 6 multiplication grids that could be used).
Ask the children to throw their dice to create a fraction. Once they have created their fraction, ask them how many equivalent fractions they can make. They can use the multiplication grid for support where necessary. Record their equivalent fractions on their whiteboard (or notebook).

Timing: Allow approximately 10 minutes for this.

Activity 2

- Slide 7: This activity is to encourage children to reason whether a pair of fractions are equivalent or are not equivalent. The stem sentences are on the slide.
Here the children can compare the two fractions by first looking at the two numerators and at the first example. You can then click to show the second example.
 - The numerators have been scaled up by 3.
 - The denominators have been scaled up by 2.
 - This means they are NOT equivalent fractions.

There is a second example on the slide.

Then give out the cards on Handout 2 and ask the children to sort the pairs into those which are equivalent fractions and those which are not.

For anyone who needs an extra challenge there are blank cards, Handout 3, for the children to create their own equivalent/non-equivalent fractions.

Timing: Allow approximately 10 minutes for this.

- Slides 8 and 9 considers the key idea that **fractions can be simplified by dividing both the numerator and denominator by a common factor.**
Firstly, remind children of the terms **factor** and **multiple**. There are stem sentences on slide 8 to enable children to develop their confidence with this language. The slide is annotated to show two examples.



Activity 3

- Slide 10 develops this further by considering the term **highest common factor**. Start by asking the children to list the factors of 8, which are 1, 2, 4 and 8. Now list the factors of 12, which are 1, 2, 3, 4, 6, 12. The highest factor which is in both lists is called the **highest common factor**. In this case it is 4. The slide is animated to explain this. You may wish to try some other examples such as the highest common factor of 9 and 15, the highest common factor of 14 and of 21. Now play the loop card game which consists of 10 cards, to be played in pairs of a small group. The order on Handout 4 provides the answers. These cards will need to be cut up before playing the game.

Timing: Allow approximately 10 minutes for this.

The plenary starts on slide 10

- Slide 11 shows the fraction family for $\frac{1}{3}$. Explain that the simplest form of the fraction here would be $\frac{1}{3}$. Ask them, in pairs, to discuss what this means. **Teaching point.** Be careful here, if the children suggest they are making the fractions as small as possible this is **not** correct as the size of the fraction stays the same as they are all **equivalent** fractions and therefore have the same value. The numerator and the denominator are just being made as small as possible whilst keeping them in the same proportion.
- Slide 12 is animated to model how to ensure you have found the highest common factor and therefore simplified the fraction. Read out the sentence on the slide together

Activity 4

- Slide 13 is Activity 4. This allows the children, in small groups, to sort through fractions on Handout 5 into those that have been simplified and those that have not.
- There are sentence starters on the slide to support children as they reason why their fraction is or is not in its simplest form.
- Slide 14 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

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

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5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
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11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144



Handout 2



$$\frac{1}{6} = \text{or} \neq \frac{4}{20}$$

$$\frac{15}{20} = \text{or} \neq \frac{3}{4}$$

$$\frac{2}{5} = \text{or} \neq \frac{4}{10}$$

$$\frac{18}{20} = \text{or} \neq \frac{9}{10}$$

$$\frac{2}{9} = \text{or} \neq \frac{4}{18}$$

$$\frac{1}{8} = \text{or} \neq \frac{2}{16}$$

$$\frac{4}{12} = \text{or} \neq \frac{1}{3}$$

$$\frac{5}{15} = \text{or} \neq \frac{1}{3}$$

$$\frac{5}{10} = \text{or} \neq \frac{1}{5}$$



Handout 3



— = or ≠ —	— = or ≠ —	— = or ≠ —
— = or ≠ —	— = or ≠ —	— = or ≠ —
— = or ≠ —	— = or ≠ —	— = or ≠ —



Handout 4



Start	3	5	2
The highest common factor of 12 and 15	The highest common factor of 15 and 20	The highest common factor of 4 and 6	The highest common factor of 16 and 20
4	10	7	6
The highest common factor of 10 and 20	The highest common factor of 14 and 21	The highest common factor of 18 and 24	The highest common factor of 40 and 48
8	12		
The highest common factor of 24 and 36	Finish		



Handout 5



$\frac{3}{15}$	$\frac{1}{5}$	$\frac{4}{20}$	$\frac{25}{36}$	$\frac{1}{6}$
$\frac{7}{21}$	$\frac{18}{30}$	$\frac{5}{15}$	$\frac{11}{20}$	$\frac{23}{30}$
$\frac{1}{2}$	$\frac{2}{4}$	$\frac{6}{10}$	$\frac{10}{20}$	$\frac{13}{17}$



Fractions: Keywords Flashcards



Fraction

Denominator

Numerator

**Equivalent
fractions**

**Scale
factor**

Simplify

Factor

Multiple

**Highest
common
factor**



Simplify



Factor



Multiple



Highest common factor

