

Fractions: Lesson 5

Multiplying Fractions

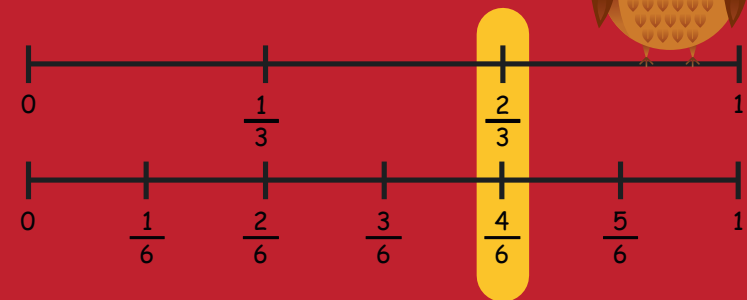
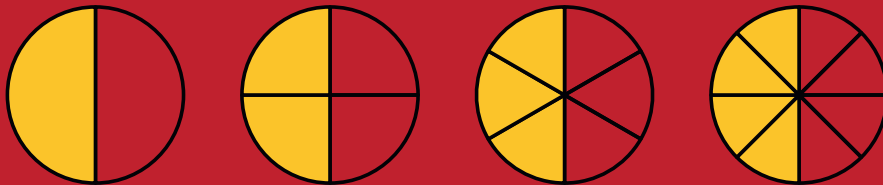
Maths KS2 Years 5 and 6

Common
denominator

Commutative

Factor

Product



Maths Lesson 5: Fractions

Multiplying Fractions

Maths

Key Stage 2 Years 5 and 6

Learning Objectives

To deepen understanding that:

- when a fraction is multiplied by a proper fraction, it makes it smaller
- to multiply two fractions, multiply the numerators and multiply the denominators
- multiplying fractions is also commutative

Curriculum Link

- to solve problems that involve fractions

Keywords from previous lessons

Equivalent fractions. Denominator. Numerator. Factor. Common denominator.

Keywords for Lesson 5

Commutative. Product.

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

Product

Commutative

Factor

**Equivalent
fractions**



You will need the following resources for this lesson:

- Pupil whiteboards and pens, or else notebook and pens.
- Handout 1 for Activity 1: Loop Game
- Handout 2 for Activity 1: Blank Loop Game
- Handout 3 for Activity 3: Matching Game
- Handout 4 for Activity 4: Dice Game
- Handout 5 for Activity 6: Three in a Row Game
- Handout 6 for Activity 6: Three in a Row Game
- A set of counters in two colours for Activity 6: Three in a Row Game

PowerPoint presentation

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

- Slides 1 and 2 introduce the lesson and the learning aims.
- Slide 3 reminds children how to multiply whole numbers and fractions. For example, to find $\frac{1}{3}$ of 15, the 15 needs to be divided into 3 equal parts and then we need to find the value of one of those parts.

Explain to the children that as multiplication is commutative this can be written as: $\frac{1}{3} \times 15$ or $15 \div 3$.

Children can also reflect upon the fact that when a whole number is multiplied by a fraction the number (the product) becomes smaller. Slide 3 models this using a bar model image. The sentence is written on the slide, and you could read this together with the children.

Activity 1, using Handouts 1 and 2

- Slide 4 introduces Activity 1, for which you need Handout 1, a Loop Game, to be played in small groups. The rules of the game: children shuffle the cards and share them out. Whoever has the start card reads out the question on the card ($\frac{1}{2} \times 12$) and puts their card on the table for the group to see. The other children look at the answers on the top of their own cards, and whoever has the answer reads it out (a half of 12 is 6). They then read out the new question on their card ($\frac{1}{4} \times 16$) and put the card on the table next to the first one (a bit like dominoes). The game continues until the last person puts down the end card. Children can reshuffle the cards and replay the game. They could time themselves to try to beat their time, or to be faster than another group. For those children working at greater depth, they could create their own loop game using the blank cards on Handout 2.

This game can be played a couple of times.

Timing: Allow approximately 5 minutes.



Activity 2

- Slide 5 features Activity 2 and introduces children to multiplying two proper fractions. This slide is animated. To deepen their understanding, give each child two paper strips and ask them to fold one of the strips into four quarters.

Now ask them to fold the quarters in half. Ask what fraction you have made now? This is equal to $\frac{1}{8}$.

Show the first image on the board and highlight how they have made '**a half of a quarter**'.

Now ask the children to fold their second strip in half and then into quarters.

Allow the children to talk in pairs and to consider what the calculation is now.

They should be able to explain '**a quarter of a half**'.

Ask the children, in pairs, to discuss what's the same and what's different about the two images.

Reiterate that the number sentence could read $\frac{1}{2}$ of $\frac{1}{4}$ or $\frac{1}{4}$ of $\frac{1}{2}$. The answer will be the same, **because multiplication is commutative**, however the journey to the answer would be slightly different depending on whether you divided by 2 or by 4 at the start.

Also emphasise that **multiplying the two fractions together has made the fraction smaller**.

Read out the sentence together.

When multiplying unit fractions, the product is smaller than the fractions being multiplied.

Activity 3 using Handout 3

Activity 3 is a matching game. The children will need to find three matching cards: the multiplication question, an image to represent this and the answer (product). They can play in pairs or groups. Place the cards face down, then the children reveal three cards. They need to find the three cards that match the fraction.

- Slide 6 explains this game.

Show the slide and ask questions such as:

- What fraction is being represented by the green bars? (thirds)
- What fraction is being represented by the yellow blocks? (fifths)

Now show the fraction question and ask:

- Where is the one third being represented in the image?
- Where is the one fifth being represented in the image?

The question therefore is $\frac{1}{5}$ of $\frac{1}{3}$.

How can we find out how many parts are in the whole? (by multiplying the denominators).

The whole has now been divided into fifteenth so the answer would be $\frac{1}{15}$.

Timing: Allow approximately 10 minutes for this game.



- Slide 7 focuses on considering how **when multiplying two fractions, multiply the numerators and multiply the denominators.**

So far, the children have been considering what happens when multiplying unit fractions.

Now we will be considering what happens when multiplying non-unit fractions.

Show the calculation on slide 7. This slide uses Cuisenaire rods images to deepen understanding. You may wish to further annotate the bars with $\frac{1}{3}$ and $\frac{1}{4}$.

The slide is animated with images to explain the steps.

- Slide 8 shows the children a quicker method for multiplying fractions. Read the sentence together and then ask if the answer can be simplified.

Activity 4 using Handout 4

- Slide 9 shows Activity 4, a dice game, which uses Handout 4. The rules are on the handout and on the slide.

The aim of the game is to practice multiplying fractions together. The winner is the player who creates the lowest product.

Timing: Allow approximately 10 minutes.

Activity 5 and Plenary

The plenary provides opportunities for reasoning while also practising multiplying fractions by multiplying the numerators and multiplying the denominators.

- Slide 10 shows **Activity 5**. Ask the children, working in pairs on whiteboards (or using a notebook), to find as many different calculations as possible that have a product of $\frac{5}{24}$.

Possible solutions are:

$\frac{5}{8} \times \frac{1}{3}$ $\frac{5}{6} \times \frac{1}{4}$ $\frac{5}{12} \times \frac{1}{2}$, although some children may include products that are equivalent to $\frac{5}{12}$ such as $\frac{5}{6} \times \frac{2}{8} = \frac{10}{48}$ which is equivalent to $\frac{5}{24}$, etc.

Timing: Allow approximately 5 minutes.

Activity 6, using Handouts 5 and 6

- Slide 11 shows Activity 5, using Handouts 5 and 6.

This is a three in a row game. The rules of the game are on the slide.

Timing: Allow approximately 10 minutes.

- **Slide 12** 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: Loop Game



Start	6	4	8
$\frac{1}{2} \times 12$	$\frac{1}{4} \times 16$	$\frac{1}{3} \times 24$	$\frac{1}{5} \times 25$
5	10	3	7
$\frac{1}{9} \times 90$	$\frac{1}{8} \times 24$	$\frac{1}{5} \times 35$	$\frac{1}{3} \times 27$
9	12	11	1
$\frac{1}{2} \times 24$	$\frac{1}{5} \times 55$	$\frac{1}{3} \times 3$	Finish



Handout 2 for Activity 1: Blank Loop Game

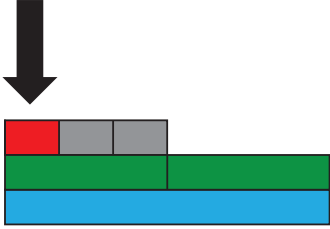
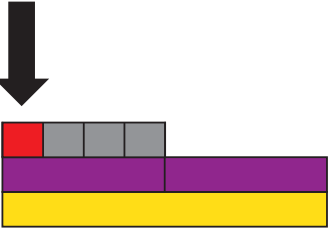
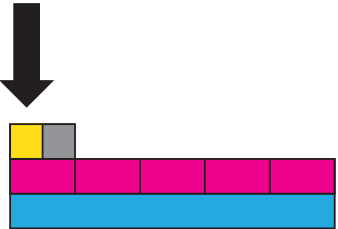
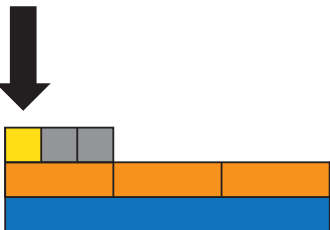


Start			
			Finish



Handout 3 for Activity 3: Matching Game



$\frac{1}{3} \times \frac{1}{2}$	$\frac{1}{4} \times \frac{1}{2}$		$\frac{1}{9}$
$\frac{1}{6}$	$\frac{1}{3} \times \frac{1}{3}$		
$\frac{1}{8}$	$\frac{1}{2} \times \frac{1}{5}$		$\frac{1}{10}$



Handout 4 for Activity 4

The rules

Player 1:

Throw your dice to create 2 proper fractions. If you throw the same number with both dice, roll again, so that the numbers are different.

Player 2:

Throw your dice to create 2 proper fractions.

Write the 2 fractions calculations on your white board.

Now multiply both of your fractions together. Compare your answers.

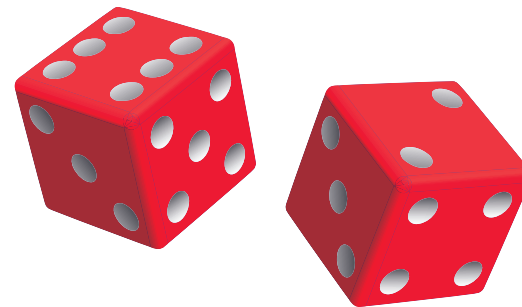
Whoever has the smaller product gets 1 point.

The winner is the first to get 10 points.

HINT:

Remember that the denominator will be larger than the numerator when making proper fractions.

$$\frac{\square}{\square} \times \frac{\square}{\square} = \frac{\square}{\square}$$



Handout 5 for Activity 6: Three in a Row Game



$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{6}$	$\frac{3}{10}$	$\frac{1}{3}$
$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{9}$	$\frac{9}{20}$	$\frac{3}{16}$	$\frac{5}{8}$
$\frac{3}{20}$	$\frac{5}{24}$	$\frac{1}{3}$	$\frac{5}{8}$	$\frac{3}{16}$	$\frac{3}{10}$
$\frac{2}{5}$	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{5}{12}$	$\frac{5}{9}$
$\frac{6}{15}$	$\frac{8}{15}$	$\frac{2}{5}$	$\frac{1}{10}$	$\frac{3}{20}$	$\frac{4}{15}$
$\frac{1}{8}$	$\frac{1}{2}$	$\frac{5}{12}$	$\frac{1}{3}$	$\frac{1}{8}$	$\frac{9}{20}$



Handout 6 for Activity 6: Three in a Row Game

How to play

First, divide the counters into 2 different coloured piles and choose a colour for each player.

Player 1 throws the dice. Match the number you threw to the fraction and then throw again and match another fraction. If you throw the same number on each dice, please roll again, so that both fractions are different. Now multiply the two fractions together and find that fraction on the board and cover it with a counter.

Now it is player 2's turn.

If the square is already covered and there are no other squares available then you miss your turn.

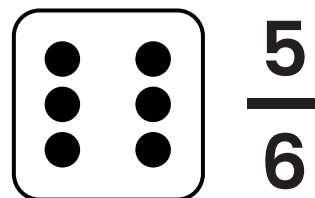
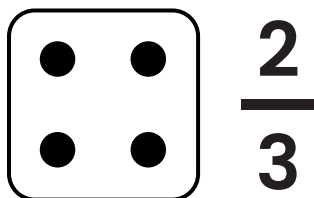
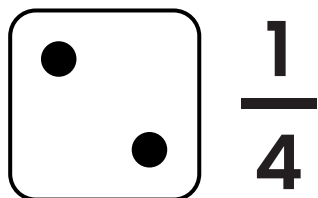
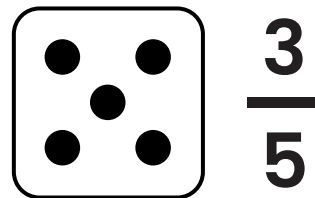
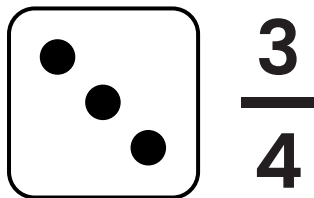
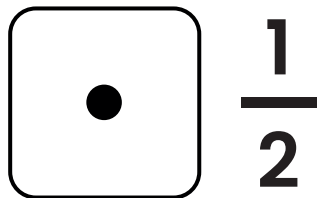
The aim of the game is to get three in a row.

You will need:

1-6 dice

Counters in two colours

Pupil whiteboard & pen



Fractions: Keywords Flashcards



**Equivalent
fractions**

Denominator

Numerator

Factor

Multiple

**Highest
common
factor**

**Common
denominator**

Commutative

Product



Commutative



Product

