Spring Block 1

Fractions B

Small steps

Step 1	Multiply a unit fraction by an integer
Step 2	Multiply a non-unit fraction by an integer
Step 3	Multiply a mixed number by an integer
Step 4	Multiply fractions by fractions
Step 5	Divide a fraction by an integer
Step 6	Divide any fraction by an integer
Step 7	Fraction of an amount
Step 8	Fraction of an amount – find the whole

Multiply a unit fraction by an integer

Notes and guidance

In this small step, children encounter multiplication number sentences with fractions, multiplying unit fractions by an integer.

Make links to multiplication as repeated addition: if children know that $\frac{1}{5} \times 4 = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$, this will link back to previous learning and avoid the common misconception of multiplying both the numerator and the denominator by the integer.

Bar models are a useful representation and can show the calculations in multiple or single bars. Year 5 children may need to spend longer exploring multiplication as repeated addition alongside the bar models to support their understanding. When answers are greater than 1, encourage children to write their answers as a mixed number. A number line is a useful representation to support children with this.

Things to look out for

- Children may multiply both the numerator and the denominator by the integer, and not recognise that this is the process for finding equivalent fractions, not for multiplying fractions by integers.

Key questions

- How can you write this multiplication as a repeated addition? How does this help you to work it out?
- How can you represent this question as a bar model?
- When you multiply a fraction by an integer, what happens to the numerator? What happens to the denominator?

Possible sentence stems

- To multiply a fraction by an integer, I multiply the _____ by the integer and the _____ remains the same.

Single age small step links

- Multiply a unit fraction by an integer (Y5)
- Multiply fractions by integers (Y6)

National Curriculum links

- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams (Y5)
- Multiply proper fractions by whole numbers (Y6)

Multiply a unit fraction by an integer

Key learning

- Write the multiplications as repeated additions.

3×5 2×7 5×4

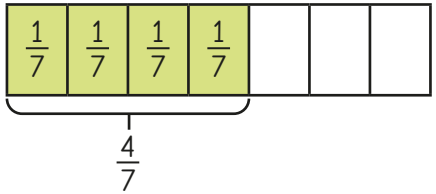
How would you write $\frac{1}{4} \times 5$ as a repeated addition?

- Write the multiplications as repeated additions.

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

What do you notice?

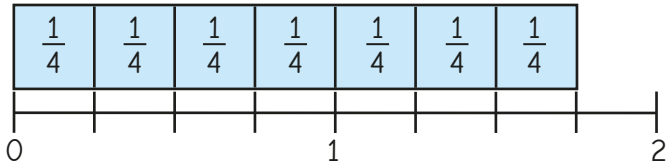
- Whitney uses a bar model to work out $4 \times \frac{1}{7} = \frac{4}{7}$



Use Whitney's method to work out the multiplications.

- $5 \times \frac{1}{6}$
- $6 \times \frac{1}{7}$
- $4 \times \frac{1}{3}$
- $\frac{1}{8} \times 3$

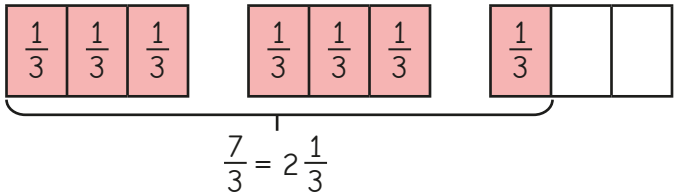
- Eva uses a number line to work out $\frac{1}{4} \times 7 = \frac{7}{4} = 1\frac{3}{4}$



Use Eva's method to work out the multiplications.

- $\frac{1}{4} \times 5$
- $\frac{1}{5} \times 7$
- $\frac{1}{3} \times 6$
- $5 \times \frac{1}{2}$

- Ron uses a bar model to work out $7 \times \frac{1}{3} = 2\frac{1}{3}$



Use Ron's method to work out the multiplications.

- $\frac{1}{5} \times 12$
- $\frac{1}{4} \times 9$
- $7 \times \frac{1}{2}$
- $\frac{1}{6} \times 15$

- Complete the multiplications.

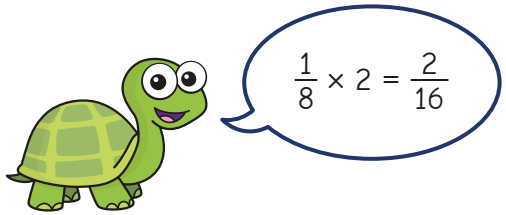
Give your answers as mixed numbers.

- $\frac{1}{9} \times 10$
- $8 \times \frac{1}{3}$
- $\frac{1}{2} \times 11$
- $15 \times \frac{1}{8}$

Multiply a unit fraction by an integer

Reasoning and problem solving

Tiny is multiplying a unit fraction by an integer.



Explain Tiny's mistake.

Tiny has multiplied the denominator as well as the numerator.

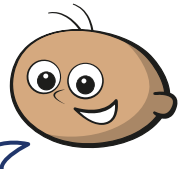
Is the statement always true, sometimes true or never true?

When you multiply a unit fraction by the same number as its denominator, the answer will be 1 whole.

Explain your answer.

always true

Tommy is thinking of a unit fraction.



When I multiply the fraction by 8, it is smaller than a whole.

When I multiply the fraction by 11, it is greater than a whole.

What could Tommy's fraction be?

What can it **not** it be?

Compare answers with a partner.

It could be $\frac{1}{9}$ or $\frac{1}{10}$

It cannot be any fraction less than $\frac{1}{9}$ or greater than $\frac{1}{11}$

Multiply a non-unit fraction by an integer

Notes and guidance

In this small step, children build on the previous step to multiply non-unit fractions by integers.

As in the previous step, children make the link between multiplication and repeated addition, and use bar models and number lines to support calculations. While children in Year 5 may need longer using bar models to represent the calculations, Year 6 children should become more fluent and recognise the generalisation that they need to multiply the numerator by the integer and leave the denominator the same.

In the next step, children combine their learning from the first two steps to multiply mixed numbers by integers.

Things to look out for

- Children may think that when multiplying, the answer is always greater than both of the numbers. For example, they may think the result of $3 \times \frac{3}{10}$ must be greater than 3
- Children need to be confident in converting between improper fractions and mixed numbers.

Key questions

- How can you write this multiplication as a repeated addition?
- How can you represent this multiplication as a bar model?
- When you multiply a fraction by an integer, what happens to the numerator? What happens to the denominator?
- What is your answer as a mixed number? What is it as an improper fraction?

Possible sentence stems

- To multiply a fraction by an integer, I multiply the _____ by the integer and the _____ remains the same.

Single age small step links

- Multiply a non-unit fraction by an integer (Y5)
- Multiply fractions by integers (Y6)

National Curriculum links

- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams (Y5)
- Multiply proper fractions by whole numbers (Y6)

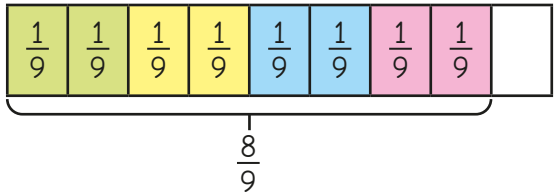
Multiply a non-unit fraction by an integer

Key learning

- Write the multiplications as repeated additions.

$2 \times \frac{3}{7}$ $4 \times \frac{2}{9}$ $\frac{3}{10} \times 3$ $\frac{5}{26} \times 5$

- Nijah uses a bar model to work out $4 \times \frac{2}{9} = \frac{8}{9}$

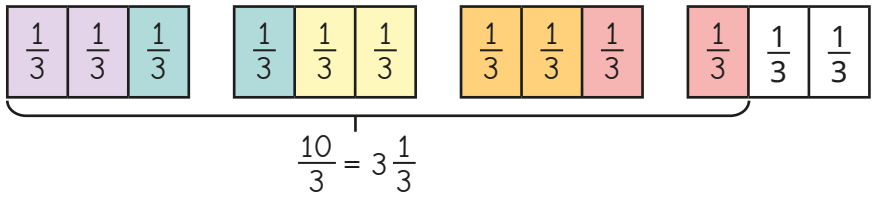


Use Nijah's method to work out the multiplications.

$\frac{3}{10} \times 2$ $\frac{2}{7} \times 3$ $4 \times \frac{3}{15}$

$3 \times \frac{3}{10}$ $3 \times \frac{2}{7}$ $5 \times \frac{2}{11}$

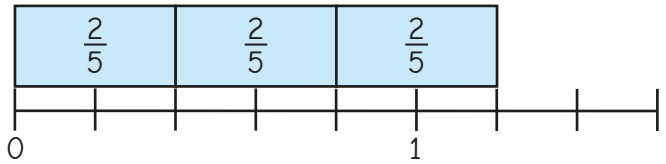
- Dexter uses a bar model to work out $5 \times \frac{2}{3} = \frac{10}{3} = 3\frac{1}{3}$



Use Dexter's method to work out the multiplications.

- $5 \times \frac{3}{4}$
- $\frac{4}{5} \times 4$
- $9 \times \frac{1}{2}$
- $\frac{3}{5} \times 7$

- Amir uses a number line to work out $\frac{2}{5} \times 3 = \frac{6}{5} = 1\frac{1}{5}$



Use Amir's method to work out the multiplications.

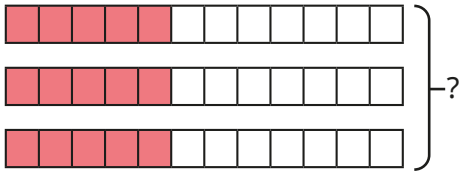
- $\frac{4}{5} \times 2$
- $3 \times \frac{5}{12}$
- $\frac{3}{10} \times 4$
- $8 \times \frac{2}{9}$

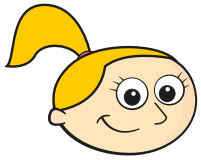
- Work out the multiplications.
  - $\frac{2}{9} \times 7$
  - $5 \times \frac{3}{4}$
  - $\frac{4}{5} \times 6$
  - $10 \times \frac{5}{9}$

Multiply a non-unit fraction by an integer

Reasoning and problem solving

Eva is working out $3 \times \frac{5}{12}$





From the bar model, I can see that $3 \times \frac{5}{12} = \frac{15}{36}$

Is Eva correct?

Explain your answer.

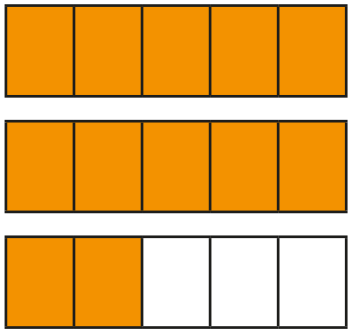
No

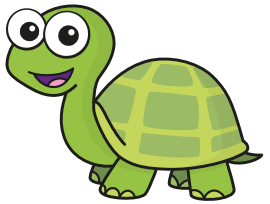
The bar model shows 3 lots of $\frac{5}{12}$

$\frac{5}{12} + \frac{5}{12} + \frac{5}{12} = \frac{15}{12}$

$= 1\frac{3}{12} = 1\frac{1}{4}$

Tiny uses a bar model to work out a multiplication.





What could the multiplication be?

Is there more than one possible answer?

multiple possible answers, e.g.

$\frac{2}{5} \times 6$ $\frac{3}{5} \times 4$ $\frac{6}{5} \times 2$

Multiply a mixed number by an integer

Notes and guidance

In this small step, children build on their learning from the first two steps to multiply mixed numbers by integers. Children need to be secure in their understanding of multiplying proper fractions by integers before adding the extra challenge of multiplying mixed numbers.

Children explore a range of methods to complete the calculations and discuss the efficiency of each. To build understanding, initially calculations should not involve converting improper fractions to mixed numbers. Once children are secure in using the methods, they can explore questions where the fractional part of the answer is greater than 1 and needs converting to a mixed number before combining the totals.

Things to look out for

- Children may write their answer as a whole number and an improper fraction rather than a mixed number.
- Children may use an inefficient method to solve a calculation, for example using improper fractions to work out $4 \times 8\frac{3}{15}$

Key questions

- When you multiply a fraction by an integer, what happens to the numerator? What happens to the denominator?
- What do you need to do if you have an improper fraction in your answer?
- Could you work it out another way? Which way is most efficient?

Possible sentence stems

- When I multiply a fraction by an integer, I multiply the _____ by the integer and the _____ remains the same.
- To multiply a mixed number by an integer, I multiply the _____ by the integer and the _____ by the integer.

Single age small step links

- Multiply a mixed number by an integer (Y5)
- Multiply fractions by integers (Y6)

National Curriculum links

- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams (Y5)

Multiply a mixed number by an integer

Key learning

- Scott is working out $1\frac{1}{4} \times 3$

I know that $1\frac{1}{4} \times 3 = 1\frac{1}{4} + 1\frac{1}{4} + 1\frac{1}{4} = 3\frac{3}{4}$

Use Scott's method to work out the multiplications.

$1\frac{1}{5} \times 3$ | $2 \times 1\frac{3}{10}$ | $2\frac{1}{7} \times 3$ | $2 \times 3\frac{4}{11}$

- Mo is working out $3 \times 4\frac{1}{5}$

I will partition $4\frac{1}{5}$ into 4 and $\frac{1}{5}$ and multiply each part by 3

$3 \times 4 = 12$ $\quad 3 \times \frac{1}{5} = \frac{3}{5}$ $\quad 3 \times 4\frac{1}{5} = 12\frac{3}{5}$

Use Mo's method to work out the multiplications.

$4 \times 5\frac{1}{10}$ | $3\frac{2}{7} \times 2$ | $5 \times 6\frac{2}{11}$ | $10\frac{2}{15} \times 7$

- Alex is working out $2 \times 4\frac{3}{5}$ by partitioning the mixed number into a whole number and a fraction.

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

Use Alex's method to work out the multiplications.

$3 \times 2\frac{3}{5}$ | $3\frac{4}{7} \times 2$ | $5 \times 6\frac{1}{3}$ | $3\frac{5}{6} \times 4$

- Esther is using improper fractions to work out $3 \times 1\frac{4}{7} = 4\frac{5}{7}$

$$3 \times 1\frac{4}{7} = 3 \times \frac{11}{7} = \frac{33}{7} = 4\frac{5}{7}$$

Use Esther's method to work out the multiplications.

$3 \times 2\frac{3}{5}$ | $2\frac{4}{9} \times 4$ | $5 \times 4\frac{2}{5}$ | $3\frac{3}{4} \times 10$

Multiply a mixed number by an integer

Reasoning and problem solving

Jack is working out $4 \times 3\frac{2}{5}$

$4 \times 3 = 12$

$4 \times \frac{2}{5} = \frac{8}{20}$

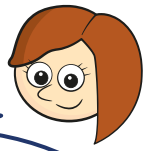
The answer is $12\frac{8}{20}$

Is Jack correct?

Explain your answer.

No

Rosie is working out $5 \times 2\frac{1}{3}$



If I work out $2 \times 5\frac{1}{3}$, I will get the same answer.

Is Rosie correct?

Explain your answer.

No

$5 \times 2\frac{1}{3} = 11\frac{2}{3}$

$2 \times 5\frac{1}{3} = 10\frac{2}{3}$

Teddy runs $3\frac{1}{5}$ miles twice a week.

Sam runs $1\frac{3}{5}$ miles four times a week.

Who runs further during the week?

Explain your answer.

They run the same distance.

Find the missing numbers.

$3\frac{\square}{5} \times \square = 13\frac{3}{5}$

Explain how you worked out the missing numbers.

$3\frac{2}{5} \times 4 = 13\frac{3}{5}$

Multiply fractions by fractions

Notes and guidance

In this small step, children build on the previous steps to multiply a fraction by another fraction.

Children use concrete and pictorial representations to support them, including folding paper, diagrams and bar models.

By exploring the pictorial representations, children see that multiplying one fraction by another is the same as finding a fraction of a fraction. Year 5 children may need to spend longer on this pictorial representation before understanding the abstract concept that fractions can be multiplied by multiplying both the numerators and denominators. Encourage Year 6 children to give answers in their simplest form.

As the fractions children multiply in this step are all proper, Year 6 children could be stretched to explain why their answer is always smaller than the fractions given in the question.

Things to look out for

- Children may believe that "multiplication always makes numbers bigger", but should realise that this is not the case when multiplying by a number less than 1

Key questions

- How can you show the calculation as a diagram?
- What is the same and what is different about "half of" a number and "$\frac{1}{2}\times$" a number?
- When you multiply two fractions, is the product greater or smaller than each of the fractions? Why?

Possible sentence stems

- To show _____, I have split my diagram into _____ equal sections.
- When multiplying a pair of fractions, I need to multiply the _____ and multiply the _____

Single age small step links

- N/A

- Multiply fractions by fractions (Y6)

National Curriculum links

- Multiply simple pairs of proper fractions, writing the answer in its simplest form (Y6)

Multiply fractions by fractions

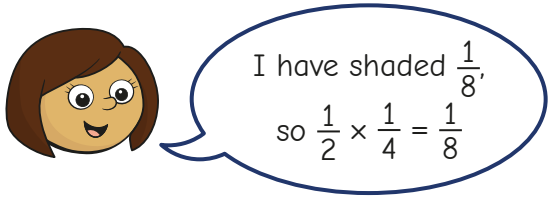
Key learning

- Kim is using a piece of paper to work out $\frac{1}{2} \times \frac{1}{4}$

  First, she folds the piece of paper in half.

  Then she folds the half into quarters.

  Kim shades the fraction that she has created.

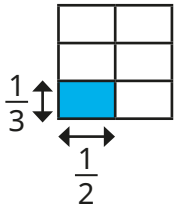


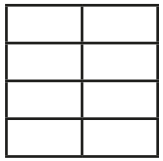
  Use Kim's method to work out the multiplications.

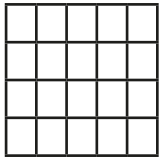
$\frac{1}{3} \times \frac{1}{2}$ $\quad$ $\frac{1}{4} \times \frac{1}{3}$ $\quad$ $\frac{1}{3} \times \frac{1}{3}$

- Brett is using diagrams to represent multiplying fractions.

  Shade the diagrams to work out the multiplications.



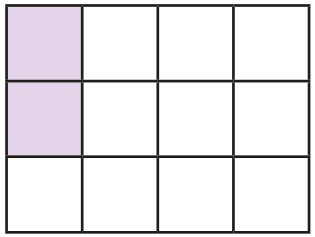




$\frac{1}{3} \times \frac{1}{2} =$ ____ $\quad$ $\frac{1}{4} \times \frac{1}{2} =$ ____ $\quad$ $\frac{1}{5} \times \frac{1}{4} =$ ____

  Can any of your answers be simplified?

- Aisha is using a diagram to work out $\frac{2}{3} \times \frac{1}{4}$



  Explain why the diagram shows $\frac{2}{3} \times \frac{1}{4} = \frac{2}{12}$

  Use similar diagrams to work out $\frac{2}{3} \times \frac{1}{5}$ and $\frac{2}{3} \times \frac{3}{5}$

- Huan has spotted a connection between the numerators and the denominators in the question and answer.

$\frac{3}{4} \times \frac{1}{5} = \frac{3}{20}$ $\quad$ $\frac{4}{5} \times \frac{3}{7} = \frac{12}{35}$ $\quad$ $\frac{4}{5} \times \frac{2}{3} = \frac{8}{15}$

  What connection has Huan spotted?

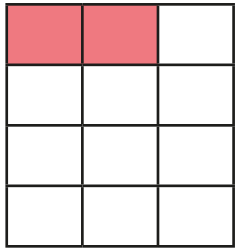
  Use the connection to work out the multiplications.

$\frac{2}{5} \times \frac{1}{2}$ $\quad$ $\frac{3}{4} \times \frac{2}{5}$ $\quad$ $\frac{2}{9} \times \frac{5}{7}$

Multiply fractions by fractions

Reasoning and problem solving

Sam uses this diagram to work out the product of two fractions.



What fractions has Sam multiplied?

What is the answer?

$\frac{2}{3} \times \frac{1}{4}$ or $\frac{1}{4} \times \frac{2}{3}$

$\frac{2}{12} = \frac{1}{6}$

Work out the missing numbers.

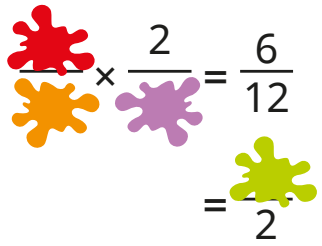
$\frac{1}{2} \times \frac{1}{\square} = \frac{1}{10}$

$\frac{\square}{3} \times \frac{2}{5} = \frac{4}{15}$

$\frac{2}{\square} \times \frac{5}{6} = \frac{1}{3}$

5, 2, 5

Find the missing numbers.



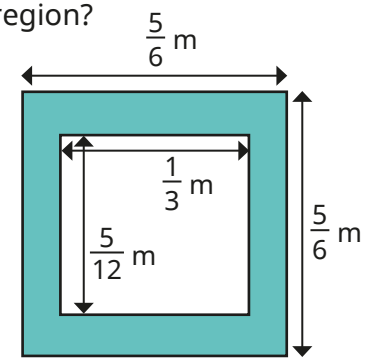
Is there more than one answer?

multiple possible answers, e.g.

$\frac{3}{4} \times \frac{2}{3} = \frac{6}{12} = \frac{1}{2}$

$\frac{3}{6} \times \frac{2}{2} = \frac{6}{12} = \frac{1}{2}$

What is the area of the shaded region?



$\frac{20}{36}$ m^2 = $\frac{5}{9}$ m^2

Divide a fraction by an integer

Notes and guidance

In this small step, Year 5 children are introduced to dividing fractions by integers for the first time.

Children focus on dividing fractions where the numerator is a multiple of the integer they are dividing by, for example $\frac{3}{5}$ divided by 3, or $\frac{6}{7}$ divided by 2

Initially, use bar models to represent fractions and to explore how to divide a fraction by an integer. Ensure that Year 6 children complete the number sentence alongside the representation to encourage them to notice that the denominator stays the same and the numerator is divided by the integer. The idea of unitising could be used to support children with dividing fractions by integers. For example, if they know that 6 ones shared between 2 is equal to 3 ones, and 6 eggs shared between 2 is equal to 3 eggs, then 6 sevenths shared between 2 is equal to 3 sevenths.

Things to look out for

- Children may divide both the numerator and denominator by the integer.
- Children may be tempted to use an abstract procedure, rather than think carefully about what the question is asking.

Key questions

- What do you notice about the numerators and denominators in the question and the answer?
- What changes and what stays the same?
- How can you show the division as a bar model?

Possible sentence stems

- If you divide _____ into equal groups, then each group is _____ because _____ ÷ _____ = _____
- _____ ones divided by _____ is equal to _____ ones, so _____ eighths divided by _____ is equal to _____ eighths.

Single age small step links

- N/A

- Divide a fraction by an integer (Y6)

National Curriculum links

- Divide proper fractions by whole numbers (Y6)

Divide a fraction by an integer

Key learning

- Dexter has $\frac{4}{9}$ of a chocolate bar.

  He shares it with Annie.

  What fraction of the chocolate bar do they each get?

- Use the diagrams to help you work out the divisions.

$\frac{2}{5} \div 2 =$ _____

$\frac{2}{7} \div 2 =$ _____

$\frac{2}{9} \div 2 =$ _____

$\frac{3}{5} \div 3 =$ _____

$\frac{6}{7} \div 3 =$ _____

$\frac{6}{7} \div 2 =$ _____

What do you notice?

- Work out the divisions.

  - $\frac{6}{11} \div 3$
  - $\frac{15}{17} \div 5$
  - $\frac{49}{50} \div 7$
  - $\frac{96}{101} \div 12$

- A bag of sweets has a mass of $\frac{10}{11}$ kg.

  What mass of sweets will each friend get if the bag is shared between 2 friends?

  What mass of sweets will each friend get if the bag is shared between 5 friends?

- Find the missing integers.

  - $\frac{9}{10} \div$ _____ $= \frac{3}{10}$
  - $\frac{12}{13} \div$ _____ $= \frac{6}{13}$

- Tom is using improper fractions to work out $1\frac{1}{3} \div 2$

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

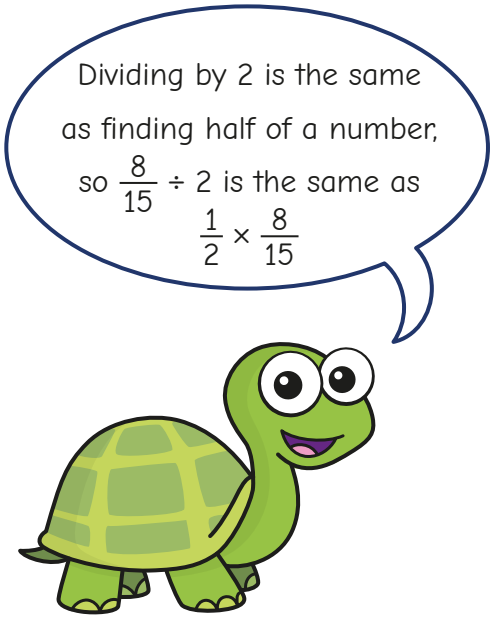
Use Tom's method to work out the divisions.

  - $1\frac{3}{5} \div 2$
  - $1\frac{4}{5} \div 3$
  - $2\frac{1}{2} \div 5$
  - $3\frac{1}{3} \div 5$

Divide a fraction by an integer

Reasoning and problem solving

Tiny is dividing a fraction by an integer.



Is Tiny correct?

Explain your answer.

Yes

Max and Dora each have $\frac{9}{10}$ of a litre of water.

- Max pours all of his water equally into 3 glasses.
- Dora pours all of her water equally into 9 glasses.

Whose glasses have more water in them?

By how much?

Max

$\frac{2}{10}$ l or $\frac{1}{5}$ l or 200 ml or 0.2 l

What could the missing numbers be?

$$\frac{\square}{10} \div 3 = \frac{\square}{10}$$

Can any of your answers be simplified?

multiple possible answers, e.g.

$\frac{6}{10} \div 3 = \frac{2}{10} = \frac{1}{5}$

$\frac{9}{10} \div 3 = \frac{3}{10}$

Divide any fraction by an integer

Notes and guidance

In this small step, children build on their learning from the previous step to divide fractions where the numerator is not a multiple of the integer they are dividing by.

There are two methods that children could use throughout this step. They could find an equivalent fraction where the numerator is a multiple of the integer they are dividing by. Alternatively, through the use of diagrams, children could explore the link between multiplying by a unit fraction and dividing by an integer. When using this method, children should be encouraged to spot the pattern that the numerator stays the same and the denominator is multiplied by the integer. It is important that children, particularly those in Year 5, do not become overly reliant on "tricks". Year 6 children could deepen their understanding by deciding which method is more appropriate for different calculations.

Things to look out for

- Following on from the previous step, children may try to divide the numerator by the integer anyway, even when it is not a multiple, for example $\frac{3}{5} \div 2 = \frac{1.5}{5}$

Key questions

- How can you show the division as a bar model?
- How is $\frac{1}{3} \div 2$ similar to $\frac{1}{3} \times \frac{1}{2}$?
- How can finding an equivalent fraction help you to divide a fraction by an integer?

Possible sentence stems

- I am dividing each _____ by _____, so I must split each part into _____ equal parts.
- _____ is equivalent to _____, so _____ ÷ _____ is equal to _____ ÷ _____

Single age small step links

- N/A

- Divide any fraction by an integer (Y6)

National Curriculum links

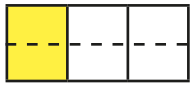
- Divide proper fractions by whole numbers (Y6)

Divide any fraction by an integer

Key learning

- Whitney is dividing one-third into 2 equal parts.

Each part is worth $\frac{1}{6}$, so $\frac{1}{3} \div 2 = \frac{1}{6}$

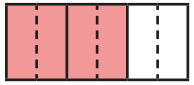


Draw diagrams to work out the divisions.

$\frac{1}{3} \div 3$ $\frac{2}{3} \div 3$ $\frac{1}{4} \div 3$ $\frac{3}{4} \div 2$

- Teddy is dividing $\frac{2}{3}$ by 4

I will find an equivalent fraction to help me divide the numerator equally.



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

$\frac{4}{6} \div 4 = \frac{1}{6}$

Use equivalent fractions to work out the divisions.

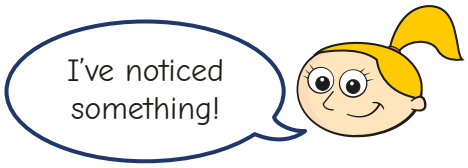
$\frac{3}{4} \div 2$ $\frac{1}{2} \div 3$ $\frac{4}{5} \div 3$ $\frac{2}{5} \div 8$

- Eva is dividing fractions by integers.

$\frac{1}{4} \div 3 = \frac{1}{12}$

$\frac{1}{5} \div 5 = \frac{1}{25}$

$\frac{4}{5} \div 5 = \frac{4}{25}$

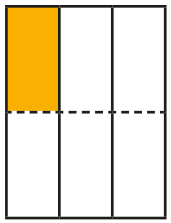


What has Eva noticed?

- Work out the divisions.

$\frac{1}{7} \div 3$ $\frac{3}{10} \div 2$ $\frac{1}{15} \div 3$ $\frac{9}{10} \div 11$

- Use the diagram to explain why $\frac{1}{3} \div 2 = \frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$



- Work out the missing numbers.
  - $\frac{1}{2} \div 2 = \frac{1}{2} \times \frac{\square}{\square} = \frac{\square}{\square}$
  - $\frac{2}{7} \div 2 = \frac{2}{7} \times \frac{\square}{\square} = \frac{\square}{\square}$

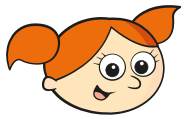
Divide any fraction by an integer

Reasoning and problem solving

Amir, Alex and Dexter are working out $\frac{3}{4} \div 3$

Amir

$3 \div 3 = 1$, so $\frac{3}{4} \div 3 = \frac{1}{4}$



Alex

$\frac{1}{4} \div 3 = \frac{1}{12}$, so $\frac{3}{4} \div 3 = \frac{3}{12}$

Dexter

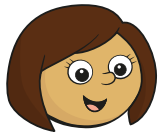
$\frac{3}{4} \div 3 = \frac{3}{4} \times \frac{1}{3} = \frac{3}{12}$

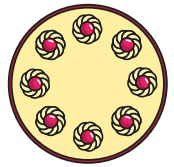
Explain why each child is correct.

Discuss each of their methods.

$\frac{1}{4}$ and $\frac{3}{12}$ are equivalent.

Kim bakes a cake.





$\frac{3}{5}$ of the cake is shared equally between 4 people.

What fraction of the whole cake does each person get?

The remainder of the cake is shared between 3 people.

What fraction of the whole cake does each person get?

$\frac{3}{5} \div 4 = \frac{3}{20}$

$\frac{2}{5} \div 3 = \frac{2}{15}$

Is the statement true or false?

$$\frac{2}{5} \div 3 = \frac{2}{3} \div 5$$

Explain your answer.

True

Fraction of an amount

Notes and guidance

In this small step, children find fractions of amounts using more pictorial and abstract methods, rather than relying on concrete resources. The main focus is on understanding that the denominator is the number of parts the whole is divided into, and the numerator represents the number of those parts that are selected.

Bar models are a useful way for children to realise the connection between parts and wholes of an amount. Ensure that Year 5 children are secure in finding unit fractions of amounts before moving on to non-unit fractions. By the end of this step, Year 6 children should be able to find fractions of an amount in different contexts. Encourage them to divide by the denominator and multiply by the numerator, understanding why they are doing this and what they are finding in each step.

Things to look out for

- Children may confuse the method due to a lack of understanding, and divide by the numerator and multiply by the denominator.
- Support may be needed for children who are not fluent with times-table facts.

Key questions

- How can you represent this question with a bar model?
- What is the first step to solving this question? What is the second?
- How do multiplication and division help you when finding fractions of an amount?

Possible sentence stems

- If one-fifth is equal to _____, then three-fifths is equal to _____
- To find a fraction of an amount, I need to divide by the _____ and multiply the result by the _____

Single age small step links

- Fraction of an amount (Y5)
- Fraction of an amount (Y6)

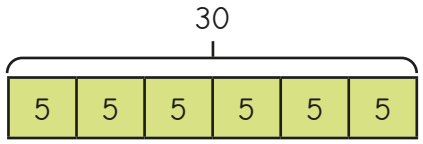
National Curriculum links

- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams (Y5)
- Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction (Y6)

Fraction of an amount

Key learning

- Dani is working out $\frac{1}{6}$ of 30



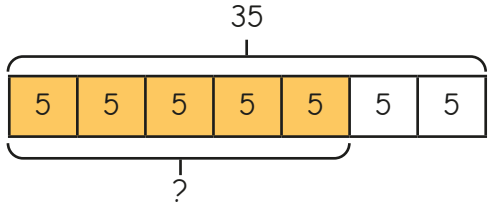
$30 \div 6 = 5$

$\frac{1}{6}$ of $30 = 5$

Use Dani's method to work out the fractions of the amounts.

$\frac{1}{5}$ of 45 | $\frac{1}{3}$ of 60 | $\frac{1}{10}$ of 300 | $\frac{1}{12}$ of 130

- Scott is working out $\frac{5}{7}$ of 35



$35 \div 7 = 5$

$5 \times 5 = 25$

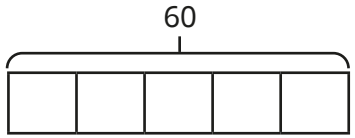
$\frac{5}{7}$ of $35 = 25$

Use Scott's method to work out the fractions of the amounts.

$\frac{3}{4}$ of 24 | $\frac{2}{5}$ of 55 | $\frac{5}{6}$ of 48 | $\frac{3}{10}$ of 120

- Mo is working out $\frac{1}{5}$ of 60 in one step.

Esther is working out $\frac{3}{5}$ of 60 in two steps.



Describe Mo and Esther's methods.

- Write <, > or = to compare the fractions of amounts.

$\frac{1}{5}$ of 60 ◯ $\frac{2}{7}$ of 49

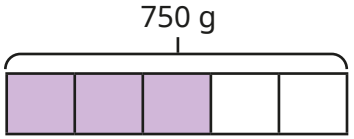
$\frac{2}{3}$ of 90 ◯ $\frac{3}{5}$ of 100

$\frac{4}{9}$ of 350 ◯ $\frac{5}{9}$ of 350

- The mass of a bag of pasta is 750 g.

Mr Lee cooks $\frac{3}{5}$ of the pasta.

How many grams of pasta are left?



Fraction of an amount

Reasoning and problem solving

Fill in the missing numbers.

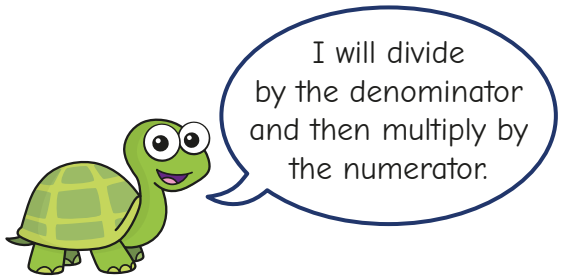
$\frac{\square}{5}$ of 60 = 48

200 = $\frac{\square}{3}$ of 300

4

2

Tiny is working out $\frac{5}{5}$ of 105

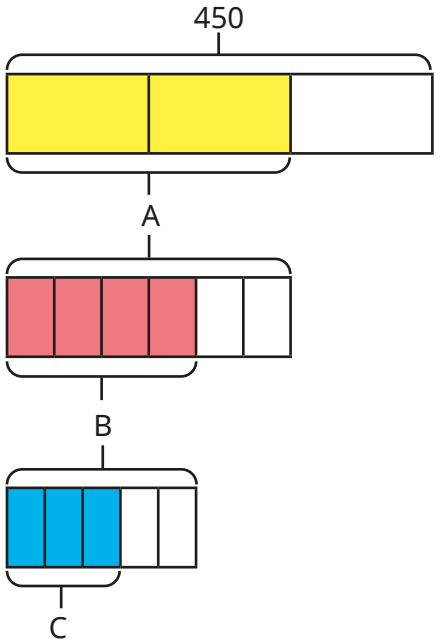


Do you think that this is the most efficient method?

Explain your answer.

No

Find the values of A, B and C.



A = 300

B = 200

C = 120

Compare methods with a partner.

Fraction of an amount – find the whole

Notes and guidance

In this small step, children find the whole amount given a fraction of it.

Using a bar model to represent the parts and the whole is a useful support to children when working through this step. When finding the whole from a unit fraction, a pictorial representation helps them to understand why they simply need to multiply the given amount by the denominator. They then find a unit fraction from a given non-unit fraction and use this to find the whole.

Draw attention to the fact that, when calculating the whole, the answer will be greater than the number in the question. This will help children to sense check their answer.

Fluency with times-tables facts is very helpful here; some children may need a times-table square as support.

Things to look out for

- Children may misinterpret $\frac{3}{4}$ of _____ = 24 as "Find $\frac{3}{4}$ of 24"
- Without pictorial support, children may find it difficult to work out whether to divide or multiply by the numerator/ denominator.

Key questions

- What is the same and what is different about finding a fraction of an amount and finding the whole?
- How can you find the whole?
- Should the whole be greater than or less than the value you are given? Why?

Possible sentence stems

- To find one part, I need to divide by _____

  To find the whole, I need to multiply by _____

Single age small step links

- Find the whole (Y5)
- Fraction of an amount – find the whole (Y6)

National Curriculum links

- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams (Y5)
- Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction (Y6)

Fraction of an amount – find the whole

Key learning

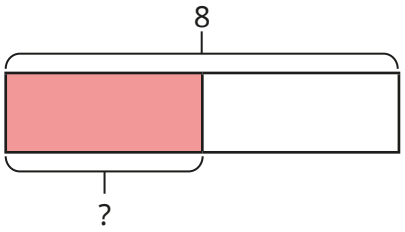
- The counters show that $\frac{1}{5}$ of a quantity is 2

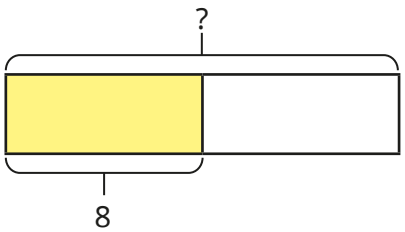
Use the bar model to work out the fractions of the same quantity.

- $\frac{2}{5}$ = _____
- $\frac{3}{5}$ = _____
- $\frac{4}{5}$ = _____
- $\frac{5}{5}$ or 1 whole = _____

- Complete the calculations.

$\frac{1}{2}$ of 8 = _____ $\frac{1}{2}$ of _____ = 8

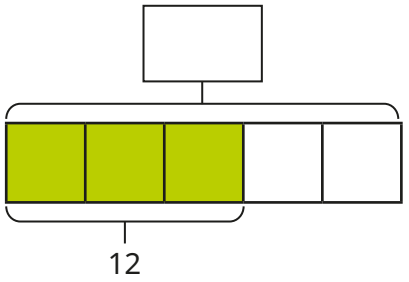


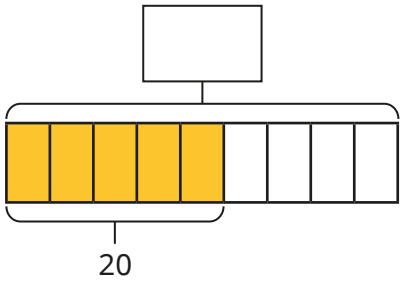


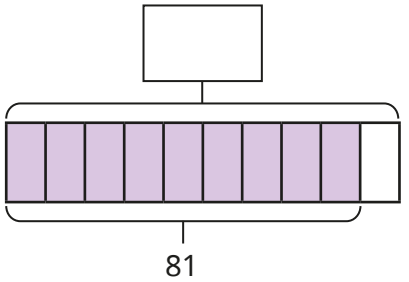
What is the same about the calculations?

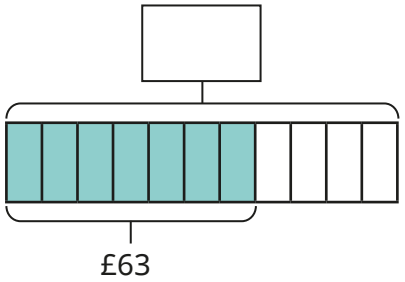
What is different?

- Work out the missing wholes.









- Find the missing numbers.
  - $\frac{2}{7}$ of _____ = 10
  - 65 = $\frac{5}{12}$ of _____
  - $\frac{\square}{7}$ of 42 = 36
  - $\frac{3}{\square}$ of 500 = 350

Fraction of an amount – find the whole

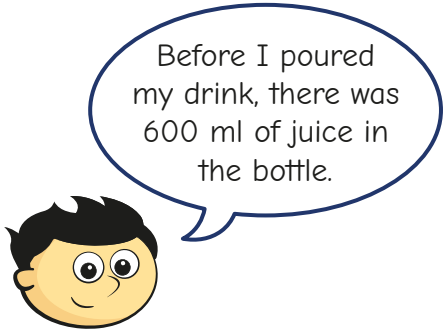
Reasoning and problem solving

Jack has a full bottle of juice.

He pours a drink from the bottle.

$\frac{3}{5}$ of the bottle is left.

There is 360 ml of juice left.



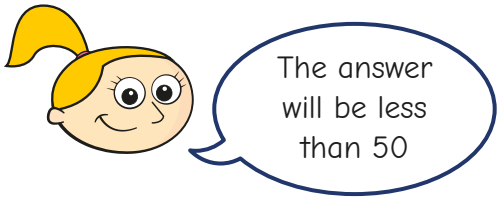
Is Jack correct?

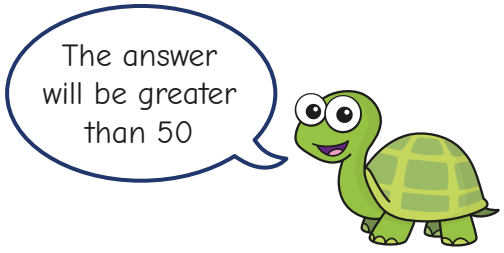
Explain your reasoning.

Yes

Eva and Tiny are working out the fraction of an amount.

$\frac{10}{3}$ of $\square$ = 50





Who do you agree with?

Explain your answer.

Eva